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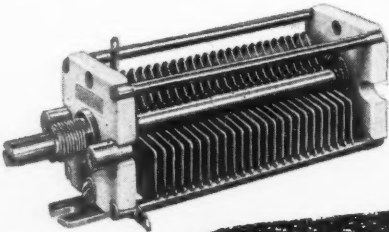
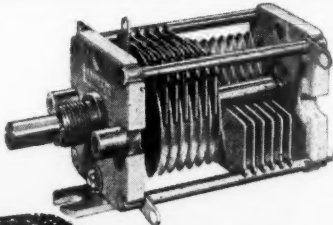
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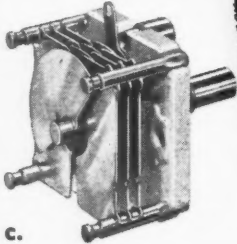
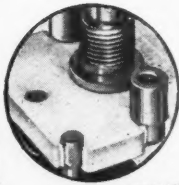
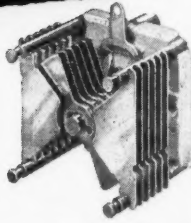
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167-103	51	4.6	1-7/16
167-104	75	5.7	1-3/4
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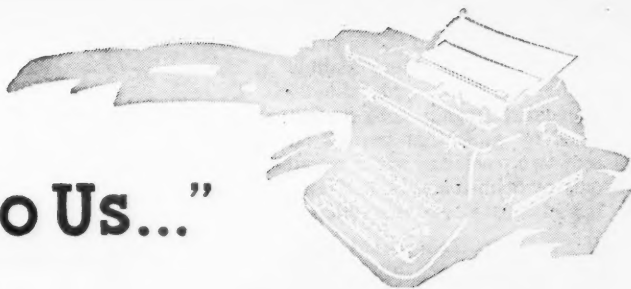
d. BUTTERFLY VARIABLES

.030" Spacing			Length Behind Panel
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167-202	26	4.3	1-7/16
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Write For NEW JOHNSON 167 VARIABLE CATALOG

"It Seems to Us..."



ulMO-ulXAM-f8AB

Twenty-five years ago — on November 27, 1923 — the radio world was astounded by the establishment of the first amateur two-way contact across the Atlantic Ocean.

The achievement electrified the amateur body. It amazed the professionals, too, for the wavelength used was in the vicinity of 100 meters — practically u.h.f. in those days, and a wave considered worthless by most authorities. It broke open the short waves: it started a general exodus well below 200 meters by both amateurs and commercials, almost disrupted the already inadequate radio legislation in this country, and started the radio art toward its search for propagation knowledge.

Such an historic event was not mere chance, of course, but the result of many months and years of planning and work. *QST*, just getting into full swing in its campaign to drop spark in favor of c.w., had started plugging also for more amateur interest in the wavelengths below 150 meters; and, in 1922 and early 1923, under the guidance of *QST*'s technical editor a small group of stations was conducting tests on wavelengths down to 90 meters. But there was no great trek to follow the few amateur pioneers who dropped to that unexplored territory. Perhaps it was because of professional belief in the superiority of longer waves (we didn't talk frequency in those days; it was wavelength) that amateurs crowded the 200-meter end of our 150-200-meter band; perhaps it was because special licenses were necessary for wavelengths shorter than 150 meters. But this is neither the time nor place to philosophize on the vagaries of human nature, to wonder why so many of us are reluctant to venture in the realm of the unknown and the untried. The fact is that it remained for just a handful of adventurous hams to pioneer in the region below 150 meters. The leadership of a few amateurs blazed a trail toward new horizons of communications, a trail which was to be eagerly followed by the body of amateurs and commercials alike.

In the ARRL transatlantic tests during the autumn of 1921, American amateur 200-meter stations had been heard in Europe for the

first time, mostly at a special receiving installation in Scotland set up by Paul Godley, 2XE, under ARRL sponsorship. The 1922 tests were another stride forward — two-way transatlantic communication loomed as a definite possibility when several two-hundred meter European stations were heard on this side for the first time. One of these was French 8AB, at Nice, France.



Leon Deloy, ex-f8AB

Let us pick up the story now by quoting from *Two Hundred Meters and Down*.

The owner of 8AB was Leon Deloy. During the summer of 1923 Deloy visited the United States to study American amateur methods, with the avowed determination to be the first to span the Atlantic. He went to the A.R.R.L.'s national convention in Chicago; he bought American radio gear; he consulted with John L. Reinartz, 1QP-1XAM, concerning his new station. He lived, thought, acted and worked with one objective — *to work across the Atlantic*. Returning home to France in early autumn, he applied all the information he had received, completed his new station and tested with British 20D in October, and in November cabled A.R.R.L. Traffic Manager Schnell that he would transmit on 100 meters from 9 to 10 p.m., starting November 25th.

Over the traffic routes of the A.R.R.L. flashed the electrifying news. Many a

Length
chind Panel
1-5/16
1-7/16
1-3/4
2-7/32
3-33/64

Length
chind Panel
1-13/16
2-27/64
3-3/8

Length
chind Panel
1-5/16
1-9/16
1-7/16

Length
chind Panel
1-3/4
1-7/16
1-15/16

CATALOG

radio!
OTA

station commenced listening. From the very first, 8AB and the identifying cypher group "GSJTP" were audible in Hartford. The next night, the 26th, Deloy transmitted again and, having been advised by cable that he was being heard, sent two messages, which were copied not only by Schnell and K. B. Warner at 1MO, but also by Reinartz at 1XAM. One was



John L. Reinartz, W3RB

a message of greetings from French to American amateur radio; the other made a schedule for an attempt at two-way work the following night.

The night of November 27, 1923, both Schnell and Reinartz were on the air. Schnell had secured special permission from the Supervisor of Radio at Boston to use the 100-meter wavelength, and everything was in readiness. At the stroke of 9:30 the strangely-stirring 25-cycle gargle from 8AB came on the air. For an hour he called America, then sent two more messages. At 10:30 he signed off, asking for an acknowledgment. Long calls from 1MO and 1XAM and then . . . there he was, asking Reinartz to stand by, and saying to Schnell, "R R QRK UR SIGS QSA VY ONE FOOT FROM PHONES ON GREBE FB OM HEARTY CONGRATULATIONS THIS IS FINE DAY MIM PSE QSL NR 12."

It was, indeed, a fine day. The job was done, though it is interesting to note from articles about it in *QST* that no one knew exactly why. *QST's* technical editor, for instance, speculated on the reasons for it, and several similar long-distance records that were made shortly thereafter, as follows: "We are for the first time doing consistent 3500-mile work because we are (for the first time) using antennas that are large — very large — for the waves at

which they are working. Working an antenna that way gives high radiation efficiency." To experimenters of that day such an explanation seemed quite logical; at least, nothing better was immediately forthcoming. In those days the ionosphere was believed to exist, but little was known about it and its behavior was a matter for conjecture. The ionosphere was still a plaything of the theoretical physicists, not something to be reckoned with by practical radiomen, and it was to be another 18 months before Reinartz presented in *QST* his ionized-reflecting-layer hypothesis.

Yes, the job was done, and done by a handful of pioneers who refused to consider that it was impossible.

Twenty-five years is a long time. It is all the more remarkable, then, that the three principals in the first transatlantic QSO are still alive today and still ardent amateurs. Although Deloy, now a retired vineyard owner, living in Monaco, has not been able to keep an active station in recent years, he maintains a thorough academic interest in amateur affairs. Fred Schnell, W9UZ, a captain in the Naval Reserve, has for some years been out in



Fred H. Schnell, W9UZ

Chicago running the police radio system. John Reinartz, W3RB, also a captain, USNR, is a research engineer and general good-will agent for the Radio Corporation of America.

The leaves of laurel can find no more worthy brows than those of Messrs. Deloy, Schnell and Reinartz.

**SWITCH
TO SAFETY!**



QST for

Building a Series-Tuned VFO Unit

A Highly-Stable Substitute for 3.5- and 7-Mc. Crystals

BY DONALD MIX, * WITS

WITHIN the past few months, one of the chief topics of discussion on the air has been the series-tuned Colpitts VFO. Most of those who have tried the arrangement have met with sufficient success to arouse a considerable amount of enthusiasm. After doing some work with the arrangement, there is no question in our minds that the circuit is superior to the conventional high-*C* oscillator on several counts.

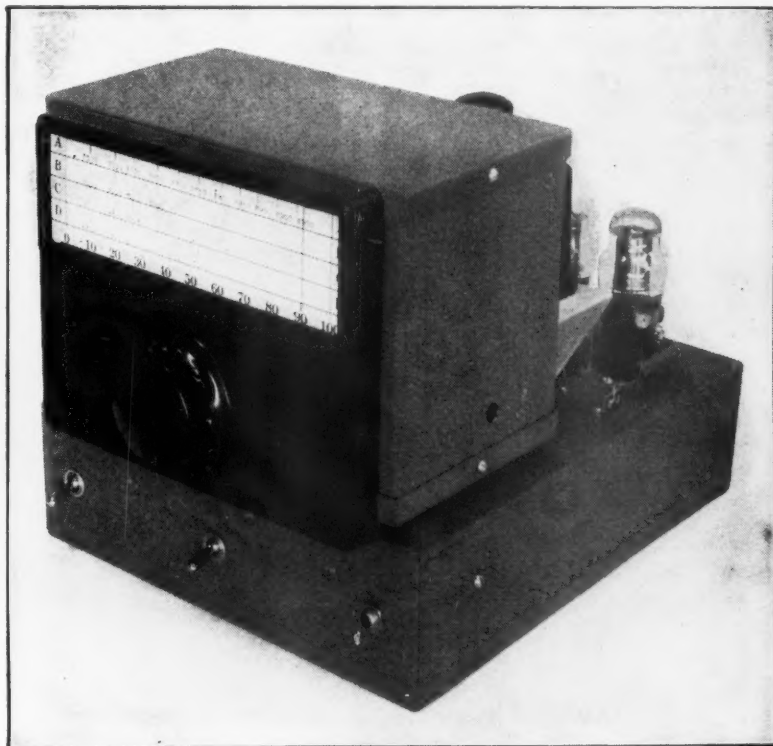
By far the most important improvement over the high-*C* circuit is the series circuit's relatively small change in frequency with change in plate voltage. This may not mean much to the 'phone man, or to the c.w. man who doesn't find it an advantage to key his oscillator. But it is of great significance when the oscillator must be keyed for break-in c.w. operation. For the first time, it offers the possibility of oscillator keying with *both* chirps and clicks reduced to negligible dimensions.

Voltage-Frequency Stability

In keying an oscillator, a well-nigh insurmountable problem has been posed by the fact that the plate voltage must change from zero, when the key is open, to the operating voltage when the key is closed. Unless the oscillator is insensitive to voltage changes, the frequency will swish as the voltage rises from zero to full value, producing the well-known chirp. The only way to avoid or reduce chirp under such a condition is to minimize the time lag in the keying circuit so that the time interval required for the voltage to rise from zero to maximum is so short that the ear cannot detect the change in frequency. Unfortunately, however, the reduction of clicks requires slowing down the rate of rise (and decay) in voltage when the key is opened and closed. Therefore, the only measure available to reduce chirps has been in opposition to the requirements of key-click reduction. With the series-tuned Colpitts circuit, the voltage-frequency stability is sufficiently good to make it possible to introduce

* Assistant Technical Editor, *QST*.

The completed VFO. The dial is calibrated for the various bands.



enough lag in the keying circuit to reduce clicks without bringing in a noticeable chirp, even at frequencies as high as 28 Mc.

Another advantage of the series-tuned circuit is that the tube is shunted by the low impedances of large condensers. This means that any effect that the tube and its load can have on the frequency of the tuned circuit will be small. Tube lead length becomes relatively unimportant at normally-used oscillator frequencies and therefore the tube and the heat it radiates can be well isolated from the frequency-determining tank circuit. These points, when combined with the fact that the tank current circulating through the coil is very small compared to that in a high- C circuit, mean that frequency drift can be brought to a very low value.

Mechanical Problems

One characteristic of the series-tuned circuit that might be called a disadvantage is that it is more sensitive to mechanical vibration. The coil becomes of large physical size, more difficult to construct and mount against the effects of vibration. The larger coil has a more-extensive field to be affected by vibration of near-by metal or dielectric. When it is considered that it may require a change in tuning-condenser capacitance of only 20 $\mu\text{fd.}$ or so to cover the entire 80-meter band, it is not difficult to understand how vibra-

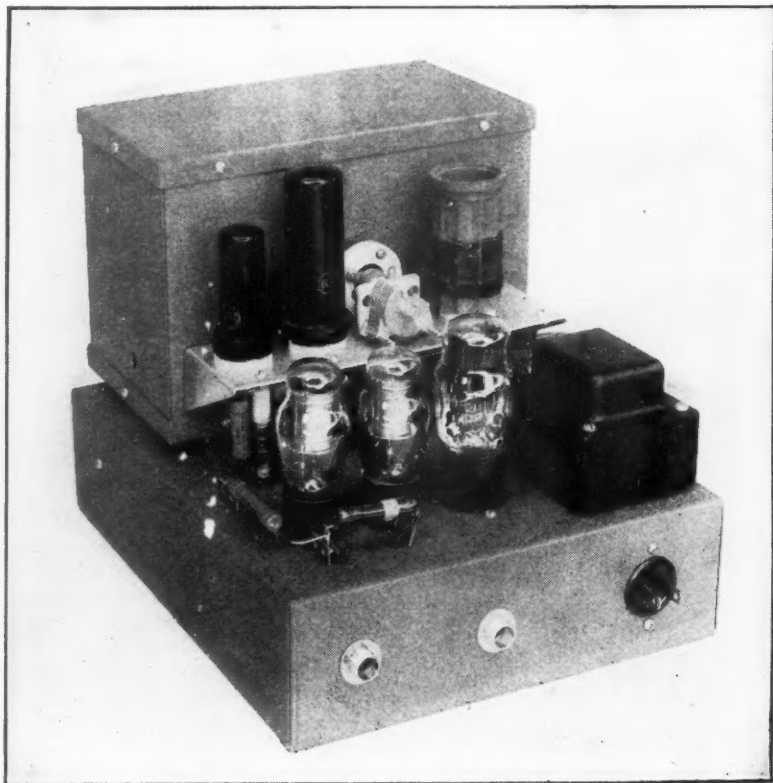
• The VFO unit shown in the photographs is built around the recently-discussed series-tuned Colpitts circuit.¹ We believe that those who build units along similar lines will agree that it is vastly superior to anything we've had in the past. The oscillator can be keyed without noticeable chirp at frequencies as high as the 28-Mc. band, frequency drift is negligible, and the shockproof mounting eliminates the effects of normal mechanical vibration. The output from this unit is sufficient to drive a pair of 807s if desired.

tion or any other form of instability in the tuning condenser can affect the frequency.

Maintaining Oscillation

Several of those who have tried the series-tuned VFO have encountered trouble in maintaining oscillation over a sufficiently-wide frequency range. It is obvious that as the series tuning capacitance is reduced, the coil — so to speak — becomes more and more nearly disconnected from the remainder of the circuit. Therefore there must be some minimum value of series capacitance beyond which oscillation

¹ "A High-Stability Oscillator," *QST*, May, 1948, p. 42.



Rear view of the series-tuned VFO showing the mounting of the components external to the oscillator tank.

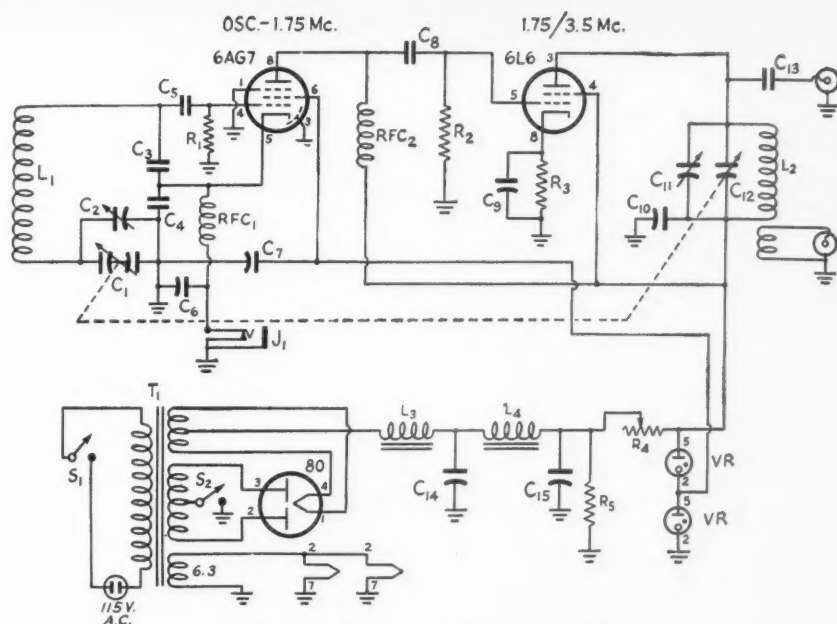


Fig. 1 — Circuit diagram of the series-tuned VFO.

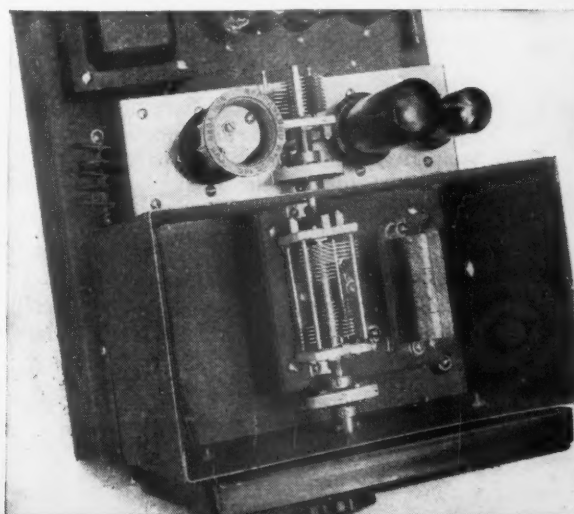
- C₁ — 50- μ fd. per section variable (Millen 23050).
 C₂ — 100- μ fd. variable (Millen 19100).
 C₃, C₄ — 0.001- μ fd. zero-temp.
 C₅, C₈ — 100- μ fd. mica.
 C₆, C₇, C₉, C₁₀ — 0.01- μ fd. paper.
 C₁₁ — 45-260- μ fd. mica trimmer.
 C₁₂ — Approx. 75- μ fd. variable (Millen 22100 with 3 stator plates removed).
 C₁₃ — 220- μ fd. mica.
 C₁₄, C₁₅ — 16- μ fd. 450-volt electrolytic.
 R₁ — 47,000 ohms, $\frac{1}{2}$ watt.
 R₂ — 0.1 megohm, 1 watt.
 R₃ — 470 ohms, 1 watt.

- R₄ — 1000 ohms, 10 watts, adjustable.
 R₅ — 50,000 ohms, 10 watts.
 L₁ — 140 μ h. (National AR-160).
 L₂ — 3.5 Mc. — 16 turns No. 22, $1\frac{1}{2}$ inches diam., $\frac{7}{8}$ inch long.
 — 1.75 Mc. — 37 turns No. 22 d.c.c., $1\frac{1}{2}$ inches diam., close-wound.
 L₃, L₄ — 14-h. 100-ma. filter choke (UTC R-19).
 J₁ — Closed-circuit jack.
 RFC₁, RFC₂ — 2.5-mh. r.f. choke.
 S₁, S₂ — S.p.s.t. toggle switch.
 T₁ — Power transformer: 350 v. r.m.s., 90 ma.; 5 volts, 3 amp.; 6.3 volts, 3.5 amp.

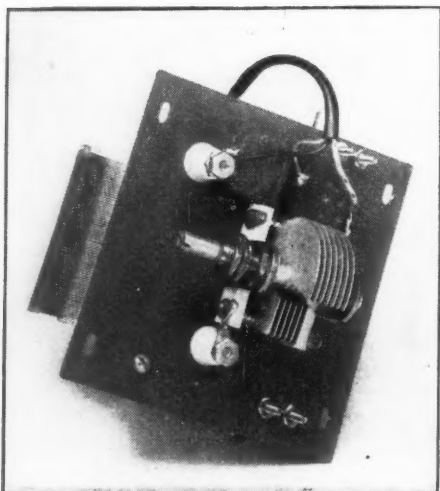
cannot be maintained. The range over which the circuit will oscillate depends principally upon the Q of the tank coil, the mutual conductance of the tube and the size of the series tuning capacitance in relation to the capacitances shunting the tube. The circuit will oscillate more readily with an increase in the Q of the tank coil, with an increase in the mutual conductance of the

tube, and by increasing the size of the tuning condenser in comparison with the size of the tube-shunting capacitances. On the other hand, the frequency stability is increased with a decrease in the capacitance of the tuning condenser relative to the tube-shunting capacitances. Therefore, for best frequency stability, the tuning capacitance should be small and the tube-shunt-

The oscillator tank circuit is isolated from the remainder of the circuit by enclosing it in a shockproof metal box.



ing capacitances large. If the oscillator will not function over the desired frequency range, the Q of the coil should be increased or a better tube selected. If neither of these is possible, the only alternative is to increase the size of the tuning capacitance or decrease the size of the tube-shunting capacitances. A change in the latter will have a relatively small effect upon the frequency of the tuned circuit, while an increase in



Bottom view of the oscillator-tank unit, showing the placement of the oscillator tuning padder and the tube-shunting condensers.

the tuning capacitance will naturally require a reduction in the size of the coil to keep the oscillator tuning to the same frequency.

Practical Circuit

The preceding considerations have been kept in mind in the design of the VFO unit shown in the photographs. Referring to the circuit diagram of Fig. 1, a 6AG7 pentode is used in the electron-coupled series-tuned Colpitts oscillator circuit. C_1 is the bandspread tuning condenser which covers the fundamental range of 1750 to 2000 kc. C_2 is a padder to provide a fixed minimum circuit capacitance. C_3 and C_4 are the tube-shunting capacitances.

In three different models tested, trouble was experienced with a slight but annoying intermittent hop in frequency. This was finally eliminated by the substitution of an air condenser for a low-temp-mica tuning-condenser padder and by shifting to a dual-section tuning condenser with the sections connected in series so as to eliminate bearing contact.

Since the screen, which serves as the plate in the oscillating circuit, is grounded, the cathode is above ground potential and therefore must be returned to ground for d.c. through an r.f. choke.

The output circuit is nonresonant (RFC_2) and is capacity coupled to a 6L6 output stage that may be operated at either 1.75 or 3.5 Mc. This permits feeding a crystal-oscillator stage that normally operates with either 3.5- or 7-Mc. crystals, without danger of oscillation in the crystal-oscillator stage, since it may always be used as a doubler. The tuning condensers of the oscillator and amplifier are ganged.

A power supply is included in the unit. Screen and plate voltages for both stages are taken from a VR-tube voltage divider. The regulator tubes are used both as a convenient voltage-divider arrangement and to limit the shaping of the keying characteristic entirely to any key-click filter that may be used with the unit.

Construction

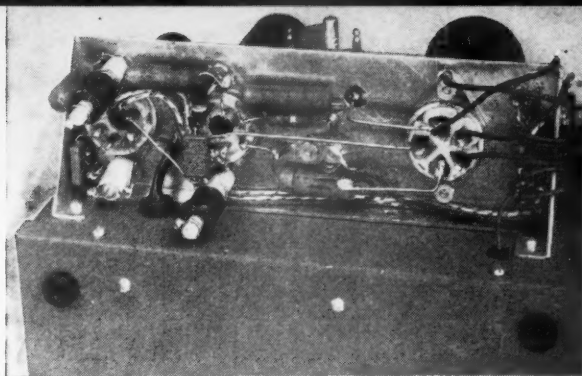
In the unit shown in the photographs, the frequency-determining tank is isolated from the rest of the circuit by enclosing it in a standard steel box $5 \times 6 \times 9$ inches. The tuning condenser is mounted on the top plate of a $4 \times 4 \times 2$ -inch steel box with metal brackets that space the bottom edges of the condenser end plates $\frac{1}{8}$ inch from the plate. The rotors of the condenser must be insulated from ground.

The coil is removed from its original mounting, the link removed, and the coil remounted on a $\frac{3}{4}$ -inch cone insulator at the forward end and a small feed-through insulator at the rear. The first quarter turn at the front end of the coil is broken loose and a short connection between the adjacent tuning-condenser terminal and the coil at this point is made with a piece of heavy wire. This serves as a brace for the coil against vibration. Another short piece of heavy wire goes from this same point to a small feed-through insulator set directly below in the top plate. This feed-through insulator and the one at the rear end of the coil serve in making connections to the condensers on the under side of the plate.

The adjustable padder, C_2 , is mounted centrally on the under side of the plate with its shaft pointed toward the right. The end of the shaft is slotted for a screwdriver and holes are drilled in the sides of both inner and outer boxes so that the padder may be adjusted from the outside after the unit has been assembled. The mica condensers, C_3 and C_4 , are fastened alongside the padding condenser by cementing them to the plate with Duco cement to eliminate movement. The top lip of the small box may have to be notched out in a few places before the top plate will fit in place.

Discarding the bottom plate of the small box, the height of the tuning-condenser shaft above the lower edge of the box should be measured carefully and large clearance holes cut centrally in the outer box at this same level. Placing the smaller box inside, with its rear face against the back wall of the outer box and with the

Underneath the shelf. The oscillator tube is to the left, the amplifier to the right. The terminal strip to the right connects to a similar strip fastened to the base chassis.



tuning-condenser shaft lined up with the shaft holes, the position of the smaller box should be marked on the rear wall. Then the top plate should be removed, the small box replaced and holes marked in the bottom of the outer box so that the smaller box can be fastened in place with screws up through the bottom. With this done, a grommet hole for the leads to the oscillator tube should be drilled simultaneously through the rear of both boxes near the oscillator-tube socket. Three leads — connections to the grid condenser, C_5 , to the cathode, and to the ground point of the screen by-pass condenser of the oscillator tube (C_7) — are bunched together and brought out through this hole.

With the oscillator-tank unit fastened in place within the large box, and flexible insulated couplings on each end of the tuning-condenser shaft, the dial can be lined up and its mounting holes marked on the front of the outer box. The lower edge of the dial plate will overhang approxi-

mately a half inch at the bottom of the box.

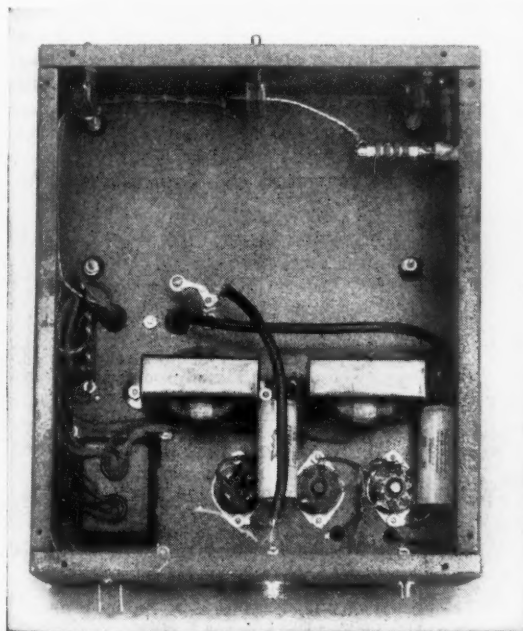
The remainder of the r.f.-circuit components are assembled on a $2\frac{1}{2} \times 8$ -inch aluminum shelf fastened to the rear of the box to isolate the tank components from the heating of the tubes. The amplifier tuning condenser, C_{12} , must be insulated from the shelf. The height of the shelf is adjusted, after the condenser has been mounted, so that its shaft lines up with the tail shaft of C_1 . Wiring and associated small parts are placed under the shelf. All power-supply connections and the key connection are made to a 5-point lug strip at the left-hand end of the shelf.

The entire unit is guarded against mechanical vibration by mounting the box on rubber grommets. A grommet is placed in each of the four corners of the bottom of the box. These are duplicated in the top of the $10 \times 12 \times 3$ -inch chassis which serves as a base. Machine screws with washers at either end are passed through both sets of grommets to fasten the floating box to the chassis. Care should be taken in locating the grommet holes in the chassis to provide $\frac{1}{16}$ inch or so of clearance between the lower overhanging edge of the dial plate and the chassis, so that the dial is free from contact with the chassis.

A duplicate lug strip is fastened to the chassis directly below the terminal strip on the shelf. The two strips are then connected together with highly-flexible wire bent to form half loops between the terminal strips. This is done to minimize any vibration that might be transmitted from the base chassis to the box through the connecting leads. Similar flexible connections are made to anchorages on the chassis for the output leads.

The output coil, L_2 , is wound on a standard $1\frac{1}{2}$ -inch diameter 5-prong plug-in form (Bud). The padder condenser, C_{11} , is mounted inside the form where it may be adjusted with a screwdriver.

The power transformer, rectifier, the two VR tubes and their voltage-dropping resistor, R_4 , as well as the bleeder resistor, R_5 , are mounted along the rear edge of the chassis. The filter chokes and condensers are placed underneath, since they develop no appreciable heat. A 115-volt power connector and two coaxial output connectors are



Bottom view of the completed series-tuned VFO unit. Power leads are cabled. The coaxial cables go to the two r.f. output connectors.

(Continued on page 106)

New Life for Old Receivers

Crystal-Controlled Converters for 14, 21 and 28 Mc.

BY BYRON GOODMAN,* WIDX

You don't hear many complaints about a receiver's performance on 3.5 and 7 Mc. The stability is good, and all T9 signals sound T9. The sensitivity is always adequate for the job. If you want more i.f. selectivity, you add a Q5-er. Images are no problem.

Depending on the receiver, you may or may not have complaints about its 14-Mc. operation. Here the drift starts to show up in some cases, images are a problem if you have only one r.f. stage, and there may be no d.c. signals on the band (indicating high-frequency oscillator modulation). On 28 Mc. you are a very fortunate individual indeed if you have never seen room for improvement. Perhaps you have added a preselector to knock out the images, or an R9-er to hop up the sensitivity, but neither of these dodges has contributed a thing to the stability.

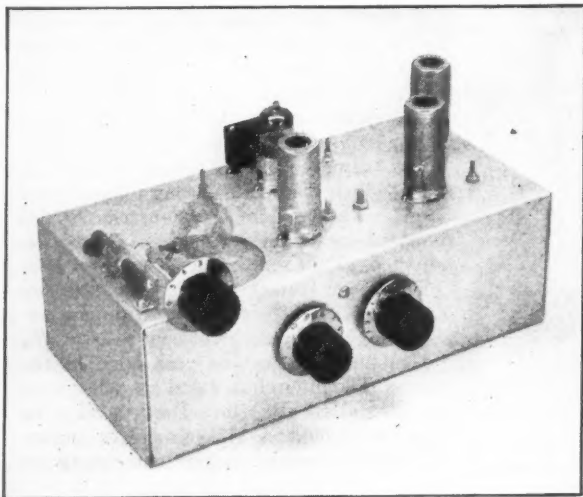
The Collins 75A receiver has the answer, of course, in its use of crystal-controlled high-frequency oscillators, as many operators are discovering. This article will describe a family of converters that can be added to your present receiver to give greatly-improved stability and some increase in sensitivity, depending on what you now use. But don't expect much if your present receiver is a clunk on 3.5 Mc. — if it isn't perfectly satisfactory there now, the best you can expect from the converters is your present 3.5-Mc. performance on 14 and 28 Mc. Further, if you have the front end of your present

• The title of this article is no overstatement — these crystal-controlled converters *will* hop up your receiver and give you 1949 performance. All that's needed is a receiver that works quite well on the low frequencies, and these converters. A crystal-controlled high-frequency oscillator gives you stability, and a neutralized-triode r.f. amplifier gives you sensitivity.

receiver loaded down with R9-ers, all the converters can offer you is a shade better sensitivity (you'll have to measure it to tell the difference — it won't show up by ear) and your present 3.5-Mc. stability and tuning rate. But even that is an advantage, as you can readily see.

You will have noticed that the talk is about "converters" and not a single "converter." Separate converters for each band are to be described, since it is felt that this results in the simplest construction and the best chance for maximum performance. Anyone who wants to take the circuit and make a bandswitching job is welcome to do so, but with individual units you can invest in one and, if you like the performance, add the others as time goes on. These little converters can be shoved out of the way when not in use, or you can rig up a switching scheme for antennas, power and output.

Since the converters are identical except for



A 28-Mc. crystal-controlled converter. The adjustable antenna coupling can be seen at the left front. The tube shields, from left to right, cover the triode-connected 6AK5 r.f. amplifier, the 6AK5 mixer and the 6C4 cathode follower. The unshielded tube is the 6J6 oscillator-multiplier.

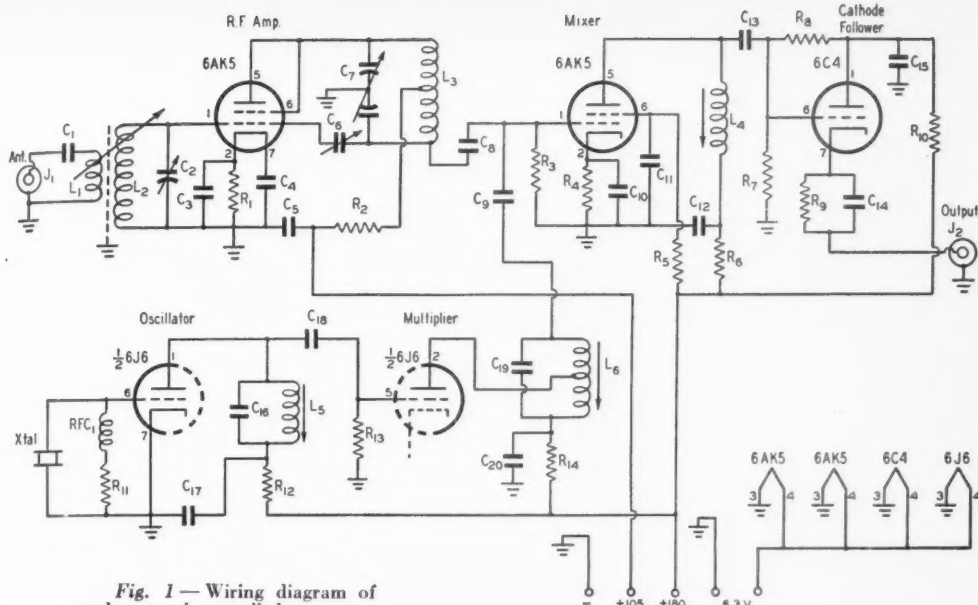


Fig. 1 — Wiring diagram of the crystal-controlled converter.

C_1 — 10- μ fd. mica.
 C_2 — 20- μ fd. midget variable (Johnson 160-110).
 $C_3, C_4, C_5, C_{10}, C_{11}, C_{12}, C_{14}, C_{15}, C_{17}, C_{20}$ — 680- μ fd. mica.
 C_6 — 5- μ fd. midget variable (Johnson 160-102).
 C_7 — 11- μ fd. midget butterfly (Johnson 160-211).
 C_8, C_{13} — 470- μ fd. mica.
 C_9 — Twisted wire. See text.
 C_{16}, C_{19} — See coil table.
 C_{18} — 47- μ fd. mica.
 R_1, R_9 — 220 ohms.
 R_2 — 2200 ohms, 1 watt.

R_3 — 56,000 ohms.
 R_4 — 6800 ohms.
 R_5 — 0.1 megohm.
 $R_6, R_{10}, R_{12}, R_{14}$ — 470 ohms.
 R_7, R_{11} — 4700 ohms.
 R_8 — 0.18 megohm.
 R_{13} — 82,000 ohms.

All resistors $\frac{1}{2}$ -watt unless otherwise specified.
 $L_1, L_2, L_3, L_4, L_5, L_6$ — See coil table.
 J_1, J_2 — Cable-connector sockets (Jones S-101).
 RFC_1 — 750- μ h. r.f. choke (National R-50).
 $XTAL$ — See coil table.

coils and crystals, only the 28-Mc. job is shown in the photographs. From now on we will talk about only one converter, but bear in mind that what is said applies to all three.

The Circuit

The converter uses the harmonic of a crystal oscillator to provide an exceedingly-stable high-frequency-oscillator signal. For example, in the 10-meter converter a 12.25-Mc. crystal doubles to 24.5 Mc., and this signal is fed to the mixer. By tuning the amplifier (your present receiver) following the mixer over the range 3.5 to 5.2 Mc., you are, in effect, tuning across the 28-Mc. band. The r.f. circuits in the converter are tuned to 28 Mc., and only have to be touched up when going from one end of the band to the other.

The wiring diagram is shown in Fig. 1. A neutralized triode-connected 6AK5 is used for the r.f. amplifier, on the thesis that it is about the hottest r.f. amplifier you can get. It does check out beautifully on a diode noise generator, but there is some question as to its necessity on 14 and 21 Mc., where the atmospheric noise is generally high enough to limit the maximum usable

sensitivity. A pentode-connected 6AK5 could probably be used with no detectable difference in performance on 14 and 21, but the triode is easy to handle and you don't lose anything by using it. And using high-impedance circuits with the pentode might give trouble from regeneration, unless the stage were neutralized. Adjustable antenna coupling and a Faraday screen are included to accommodate various antenna systems and to eliminate capacity coupling to the antenna line. The r.f. stage runs at 105 volts on the plate, since this gave the best noise figure. The separate plate lead also offers an opportunity to kill the converter by opening this circuit. A 6AK5 pentode mixer was selected as being easy to handle and quiet enough so that its noise doesn't impair the over-all performance. A triode mixer might have been used, but the pentode runs with low current and is quiet.

The plate circuit of the mixer is tuned to the center of the receiver tuning range by setting L_4 to resonate with the various shunt circuit capacitivities. The circuit has a low Q and there is little variation in gain over the range. A 6C4 cathode follower is used as a low-impedance coupling to the receiver input.

One section of a 6J6 twin triode is used for the crystal oscillator, and the other half serves as a frequency multiplier. To minimize the other harmonics existing in the plate circuit of the multiplier, the plate is tapped down on L_4 .

Construction

So much for the circuit details which, while important, do not tell the whole story. For example, to get the best possible r.f. circuits, within the space limitations, B & W "Miniductors" were used for L_1 , L_2 and L_3 . Their Q is well above that obtainable with smaller-diameter coils, and they are easy to handle. The new Johnson midjet variables seemed made for the job of tuning the signal circuits, and they do much to hold down the size of the converter to something reasonable. To insure good shielding and low-resistance ground paths, an aluminum chassis was used in preference to the more common steel jobs.

The converter is built on a $5 \times 9\frac{1}{2} \times 3$ -inch aluminum chassis, with several shield partitions to reduce unwanted interstage coupling. The most important shield is the one that straddles the r.f. amplifier socket and separates the grid and plate circuits of this stage. The grid tuning condenser, C_2 , is mounted on bakelite insulating washers, and its ground lead returns to the common ground at the tube socket, to eliminate stray coupling through chassis currents. If you don't do this, you may have trouble neutralizing the amplifier.

A $2\frac{1}{4}$ -inch diameter hole is punched in the chassis, so that the externally-mounted antenna coil, L_1 , can be coupled to the grid coil, L_2 . The Faraday screen is then mounted across this hole on the underside of the chassis. A fairly simple method of constructing the Faraday screen has been devised, so no one need have any fears

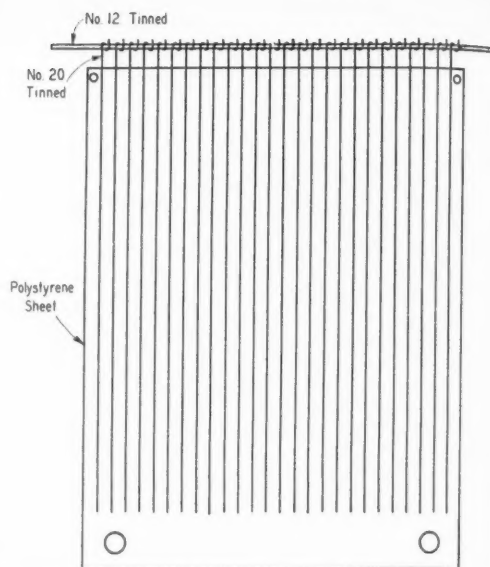


Fig. 2 — Constructional details of the Faraday shield, before soldering the ends of the No. 20 wires to the No. 12 wire bus.

about that phase of construction. To start, cut a piece of $\frac{1}{8}$ -inch-thick polystyrene (Millen Quartz-Q) to measure $2\frac{1}{2}$ by $3\frac{1}{4}$ inches, and drill a pair of holes at one end to clear No. 6 screws, for mounting the finished shield. (These are the same screws that hold the mounting strip for the antenna condenser, C_1 , visible in the first photograph.) At the opposite end of the poly sheet, drill a small hole in each corner, for securing the wire used in making the shield. Then wind No. 20 tinned wire tightly around the poly sheet in the long direction, spacing it with string or more No. 20 wire. When the winding is finished and secured at both ends, unwind the spacing string (or wire) and remove it. If you have done the job carefully, you will have neat parallel lines of wire across the polystyrene, all equally spaced and all lying fairly flat. Then apply two or three heavy coats of Duco cement to *one side only*, allowing sufficient time between coats for the cement to harden thoroughly. When this has been done, it will be found an easy job to cut each wire on the uncemented side. Straighten out the wires so that you now have a flat sheet of parallel wires, and trim off the wires at the mounting-holes end of the sheet along a line inside the mounting holes. The underneath photograph of the chassis and Fig. 2 show what this looks like. When trimming these wires, be careful to see that no wire is left touching an adjacent one. Trim the wire ends at the other end

Coil Table for the Crystal-Controlled Converter

	14 Mc.	21 Mc.	28 Mc.
L_1	23 t. No. 24 $\frac{3}{4}$ -inch diam. (B&W 3012)	9 t. No. 24 1-inch diam. (B&W 3016)	10 t. No. 20 1-inch diam. (B&W 3015)
L_2	21 t. No. 24 $\frac{3}{4}$ -inch diam. (B&W 3012)	10 t. No. 20 1-inch diam. (B&W 3015)	9 t. No. 20 1-inch diam. (B&W 3015)
L_3	38 t. No. 24 $\frac{3}{4}$ -inch diam. center-tapped (B&W 3012)	22 t. No. 24 $\frac{3}{4}$ -inch diam. center-tapped (B&W 3012)	16 t. No. 24 $\frac{3}{4}$ -inch diam. center-tapped (B&W 3012)
L_4	Slug-tuned coil (CTC 1-Mc. LS3 with 200 turns removed) (Coils for L_2 and L_4 are wound on $\frac{1}{4}$ -inch diameter CTC LS3 forms)		
L_5	No. 32 enam. close-wound, $\frac{1}{2}$ inch long	No. 32 enam. close-wound, $\frac{1}{2}$ inch long	30 t. No. 28 enam. close-wound
L_6	22 turns No. 28 enam., close-wound, center-tapped	20 t. No. 20 enam., close-wound, center-tapped	20 t. No. 24 enam., close-wound, center-tapped
C_{1a}	75 μ fd.	75 μ fd.	33 μ fd.
C_{1b}	0	22 μ fd.	22 μ fd.
X_{tal}	6000 kc. (triples)	5875 kc. (triples)	12,250 kc. (doubles)

to about $\frac{1}{2}$ inch from the polystyrene. Clamp the shield in a vise, between two pieces of wood, and wrap each wire end around a piece of No. 12 tinned copper, as shown in Fig. 2. With a good hot iron, run a bead of solder along the bus, and your shield is finished. Work fast, and no heat will reach the poly. The shield is mounted with the smooth side exposed through the hole, and one end of the No. 12 bus is grounded at the r.f. tube socket.

The grid coil, L_2 , is supported by its leads and a couple of drops of Duco cement that hold its grounded end to the Faraday shield. The antenna coil, L_1 , is mounted by its leads on a piece of $\frac{1}{4}$ -inch diameter polystyrene rod. The rod is supported by a shaft bushing. A small wire pin through the rod at the back of the bushing and a rubber grommet between the bushing and the control knob give a soft friction lock that holds the coupling in any position. Flexible leads run from the coil to C_1 and the shield of the RG-59/U coaxial line.

The r.f. plate coil, L_3 , is cemented to a small piece of polystyrene sheet that is supported by two small brackets. The neutralizing condenser, C_6 , is supported by one terminal of C_7 and a stiff wire lead back to the grid pin on the tube socket. The coupling condenser, C_9 , is simply an insulated wire wrapped once around the lead from C_8 to the grid of the mixer. It is brought out of the oscillator compartment through a polystyrene or rubber grommet.

Adjustment

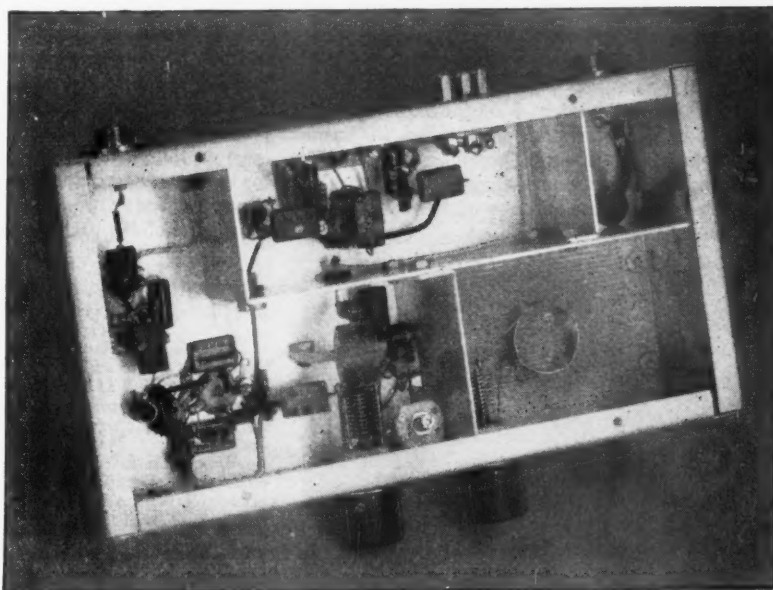
After the usual last check of the wiring, connect a power supply and remove the 6AK5 r.f. amplifier from its socket. Listen in on your receiver at

the crystal frequency, and if you don't find the crystal signal, adjust L_5 until you do. Then set your receiver on the proper harmonic frequency and peak L_5 for maximum signal, as indicated by your S-meter. When you have done this, you can probably squeeze out a little more by readjustment of L_5 . Then back off on L_5 a little, because there is no need to run the crystal at full zizz.

Then tune your receiver — its antenna circuit must complete the cathode circuit of the 6C4 follower — to about 3.8 Mc. and peak L_4 for maximum noise. The adjustment is not sharp, because of the low Q of the circuit. If your receiver has an antenna trimmer, don't forget to peak it too. Then plug in the 6AK5 r.f. amplifier and, after the tube has warmed up, rock C_2 and C_7 . Unless you are very lucky, you will find several settings where you are greeted by birdies and squawks. Through the hole in the bottom plate, use an alignment tool to adjust C_6 a little at a time, until you lose all of the unpleasant sounds with any settings of C_2 and C_7 , and you have your r.f. stage neutralized. Connect the antenna, peak C_2 and C_7 on the first signal you find, and you're in business. You will do all of your tuning with your regular receiver, and C_2 and C_7 are used only to peak the signal when you make a big frequency excursion. The adjustable antenna coupling provides some measure of gain control for the unit, but it is generally best to use fairly tight coupling and hold the gain down in your regular receiver. If a really strong local opens up, you can back off a little on the coupling. The antenna coupling was designed for low-impedance input, and will work well with 50- or 75-ohm line. If you use 300-ohm Twin-Lead, it is better to leave the

(Continued on page 108)

This view of the underside of the converter with the bottom cover removed shows the Faraday shield at the lower right, the shield straddling the r.f. amplifier socket (lower center) and the shielded oscillator section (top center). The neutralizing condenser for the r.f. stage is adjusted through a hole in the bottom cover.



TVI from 21 Mc.

ARRL Tests for Intermediate-Frequency Interference

BY GEORGE GRAMMER,* W1DF

In one way or another practically every one of our bands has got us into difficulties because of interference to broadcasting. That is no news. But it may be news that we have one band that has given us at Headquarters a continuing headache because of TVI — with no amateur operation whatsoever! It's not a superhigh band, either; the one we have in mind is 21 Mc.

It all started back during the latter days of the war. The various U. S. preparatory meetings for the next international radio conference had come and gone, and we had emerged from them with a brand-new band in our pockets — 21 Mc. Well, no, not exactly in our pockets. The band was in the *American* allocations set-up for postwar, but only in the status of a proposal. In that part of the spectrum individual nations may propose, but only an international conference does the disposing. Although an international conference was in prospect, it actually didn't materialize until two years later. So we had not an actual band, nor anything resembling a certainty of one — only hopes; hopes based on American support and some evidence of friendly interest on the part of a few other nations.

In the meantime the Engineering Department of the Radio Manufacturers Association had been working out the technical details of standards for postwar television. Among the things considered for standardization was the choice of intermediate frequency for television receivers, and eventually an agreement was reached on where the television i.f. should be placed. Although the i.f. channel is approximately 6 megacycles wide, its location in the spectrum is specified in terms of the center frequency of the sound i.f. channel; once this is specified everything else automatically falls into line. In the autumn of 1945 RMA ad-

vised FCC that its Engineering Department was proposing a standard in which the sound i.f. channel would lie in the range 21.25–21.9 Mc., the exact frequency within those limits to be selected by the individual manufacturer. The manufacturer's association also asked FCC to keep the region from 21 to 28 Mc. as clear as possible, specifically recommending that steps be taken to curb the operation or power of stations assigned frequencies in that region so that interference to TV would be minimized.

The League protested this choice of i.f. immediately, pointing out to both FCC and RMA that we expected to have a band at 21 Mc. and that the past history of home-receiver design offered no hope for anything except that an amateur 21-Mc. transmitter would blast the 'speakers from TV receivers for possibly miles around. FCC was sympathetic, but having no jurisdiction over receivers could take no practical steps. It could and, so far as we are aware, did turn a deaf ear to the plea for special privileges for TV insofar as the operations of other services were concerned. RMA expressed concern, but took no action; the i.f. channel had been decided on after long consideration and in their opinion was the best available compromise; the potential interference from all the services in that part of the spectrum was a pretty severe headache to them, too. We had no band — in fact, only one or two of the prewar bands had come back at that time — there was no television broadcasting, no receivers had been manufactured. In short, there was no way for us to prove our point — despite the certainty that if hams had been on the air on 21 Mc. no receiver designer in his right senses would put any part of a television i.f. channel near us.

In June of 1946 RMA adopted its Engineering

The buffer and final of the K2XBH transmitter are the copper-screened units at the extreme left in this photograph of W1DBM, South Norwalk, Conn. The three television receivers at the right were used to check the transmitter operation during the tests. The harmonic output of the transmitter was at such a low level that no discernible interference was caused on any of the channels in operation in New York. The one unsolved mystery is why a "2" call was assigned to a station in the 1st call area!



* Technical Director, ARRL.

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Department's recommendation and 21.25-21.9 became the RMA standard for the sound i.f. channel. To all appearances the die was cast. The manufacture of television receivers on the RMA basis got under way and soon was going at full steam. The only glimmer of brightness in the picture, for us, was the fact that a considerable number of manufacturers had chosen to work between 21.7 and 21.9, which at least was a few hundred kilocycles removed from where our band was expected to be. But an international conference sometimes turns up with the unexpected; there was no assurance that, if we got a band near 21 Mc. at all, it would start at exactly 21 Mc. The give-and-take of international negotiation *might* find us winding up near 22 Mc. — or anywhere else in that region.

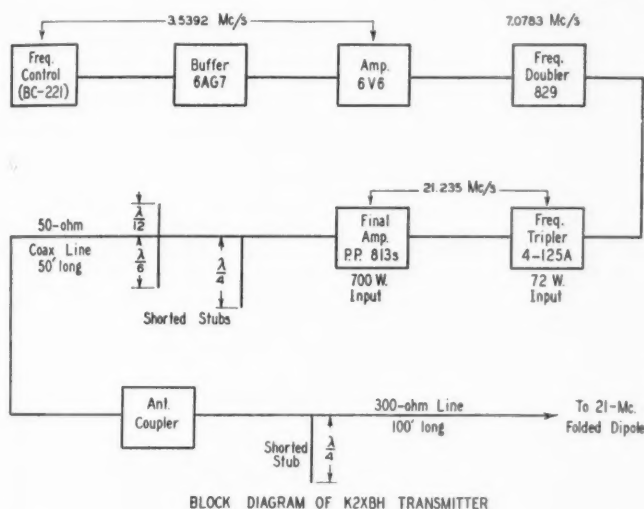
somewhere else in the spectrum. As interference got more and more serious, more and more receiver manufacturers began to wonder if the earlier standard wasn't a bit hasty. So the question was reopened again early this year. And we got in our licks again, both by written statement and by personal conference with the chairman of the RMA television-receiver committee. Although there was still no amateur operation on 21 Mc. there were by now thousands of television receivers in the homes of the public, and therefore an opportunity to demonstrate what we meant by potential amateur interference. So we agreed to put an experimental transmitter on 21 Mc., FCC willing, and see what would happen.

There was one small hitch. The Hartford area at that time had no television broadcast service.

There was a handful of widely-scattered receivers owned by superenthusiastic optimists who lived from one temperature inversion to the next in the hope of seeing New York transmissions. A test in Hartford would mean little or nothing. Some place near New York, far enough away to be in the "fringe" of the service area but near enough to have sufficiently-good service to tempt lots of people to buy receivers, would be ideal. In South Norwalk, Conn., which is just such a place, there was an amateur who had done a lot of constructive work on harmonic reduction for eliminating TVI — Philip S. Rand, W1DBM. So we asked Phil how he'd like to put a transmitter on 21 and run the tests — the "reward," the honor of being the first American ham to operate on 21 Mc. — but sans QSO! Phil was enthusiastic, FCC was interested and willing, and by midsummer the

operation was authorized, the transmitter finished and K2XBH was on the air.

Test transmissions were put out at intervals during the summer, at first without warning and later with newspaper publicity. Of four spot frequencies authorized by FCC, one at 21.235 Mc. was used for most of the work because it was closest to 21.25. It happens that 21.25 was selected by the largest TV receiver manufacturer, RCA, for its sound i.f., while most of the others are near 21.9. The data secured were of considerable significance: Receivers having a 21.25-Mc. sound i.f. reported interference at distances up to three miles from the transmitter. Receivers having a sound i.f. of 21.9 Mc. did not get interference, even at a distance of a few hundred yards. In every case, no matter what the i.f., the inter-



This is the transmitter layout used in the K2XBH tests. Every unit was shielded and all leads filtered. This, together with tuned traps in the plate circuits of the 4-125-A and 813 stages, cleaned up the harmonics. The line stubs were installed as a precautionary measure, but turned out to contribute little or nothing to the reduction of harmonic radiation.

Came 1947 and Atlantic City, and after Atlantic City 21.00-21.45 was ours — but still in the future. The receiver production lines were really getting rolling by now. More TV stations were getting on the air. By early 1948 the television boom was a reality, not just a threat. And here's where we got a break. As more and more receivers got out to the public and more and more transmitters got on the air, unexpected types of interference started to show up: stations on widely-separated channels riding in on top of each other, receiver h.f. oscillators blotting out a neighbor's pictures, images from high-band f.m. stations. There was increasing rumbling from some manufacturers to the effect that all these things could be avoided — or at least reduced to a minimum — if the intermediate frequency was

ference was in the sound channel alone; there was no interference with the picture. At distances of a quarter mile or more, traps in the receiving-antenna leads eliminated the interference on the 21.25 sets, but closer in they did not do much good, at least with receivers of current design. But changing the i.f. to 21.9 instead of 21.25 cleaned up even these receivers a few hundred feet away. We know now that we *can* live in peace with our neighbors and operate on 21 Mc. — if the i.f. is near 21.9 Mc. But not if it's 21.25. By now, RMA knows it, and FCC knows it. They, as well as we, know that the trouble is in the receiver, not the transmitter.

During this last summer the RMA committee studying the television i.f. has come out with a recommendation to abandon the present standard and to adopt a new one higher in the spectrum, the suggestion being that it ought to be placed somewhere in the region of 40 Mc. It will probably be quite a long time before definite action is taken, and receiver production on the present basis will no doubt continue for at least a year. It looks as though, eventually, we shall have no 21-Mc. i.f.-interference problem. But for many years to come the hundreds of thousands of sets produced under the present standards will be with us. The K2XBH tests have pointed the way to the cure for this situation — realigning the existing receivers, when necessary, to 21.9 Mc.

For our own checks during the tests, receivers were borrowed from GE, RCA, and Hallicrafters, each of which uses a different intermediate frequency. The GE receiver has the sound channel at 21.9 and the Hallicrafters at 21.75. When the tests showed that this interference was peculiar to sets with 21.25-Mc. sound i.f., representatives of the RCA Service Company spent several days in the Norwalk area checking their receivers and trying various means to eliminate the interference. Although their standard measures proved completely effective in many cases there were some — when the receiver was quite close to the transmitter — where a complete cure could be effected only by shifting the sound i.f. to 21.9. They decided, therefore, that whenever they experience 21-Mc. interference from amateur operation that does not yield to their standard approaches, they will shift the sound i.f. to 21.9 Mc. All this is still in the future, of course, but is something to keep in mind when and if you run into TVI after the 21-Mc. band is opened. We might remark, in passing, that the RCA Service Company people are not only well aware of the amateur interference problem in all its angles but are ready to help both the amateur and the set-owner to clean up interference cases. As usual, the organization is rather liberally sprinkled with hams and ex-hams right through the ranks up to the top!

In conclusion, we want to amplify on the phrase "the transmitter was finished" used a few paragraphs back. Only four words, but there is a world

of meaning in them. This was not just a 21-Mc. transmitter; that would have been easy. For the tests to mean anything the transmitter had to be on 21 Mc. *only*. No harmonics strong enough to cause any interference *inside* a television channel and thus throw doubt on the results. As part of the test program FCC measured the field strengths of the three principal New York television stations at the location of K2XBH — one of the best in the area for receiving New York — and found them below the 500-microvolt figure commonly accepted as the lower limit for rural areas where the noise is supposed to be low. The harmonics had to be substantially eliminated.

This meant a lot of work on Phil Rand's part, and how successfully it was accomplished is attested by the fact that with the receivers sitting in the station just as they are shown in the photograph it was possible to look at television programs without a trace of interference, with the K2XBH transmitter going full blast with 700 watts input. The TV receiving antenna was right in the line of fire of the 21-Mc. folded dipole used in the tests and only about 100 feet away. Because the 21-Mc. field strength at the TV antenna was several thousand times the strength of the television signals it was necessary to use 21-Mc. traps in the Twin-Lead at the receivers to prevent simple overloading, but that was all. Running K2XBH meant, too, giving up other ham operation for several months so the time could be devoted to making the test transmissions, collecting and correlating the results, getting the material together for the report required by FCC for any experimental operation, and conferences not only with League headquarters but FCC and receiver manufacturer's representatives. Much that was done could not have been done had it not been for the sympathetic interest in the tests on the part of Gen. Leslie R. Groves, head of the Remington Rand Laboratory of Advanced Research, where Phil is on the staff, in making both time and laboratory facilities available as needed. But still it was mostly time taken from WIDBM's other activities that went into running K2XBH for the good of the game — which, we submit, exemplifies the true amateur spirit.

Strays

Next month *QST* will include a complete description of a single-sideband exciter unit based on the W2KUJ article in the June issue. This exciter features a choice of double- or single-sideband signal with any desired amount of carrier, and simplified band changing. You may have seen the unit already — it has been demonstrated by W1DX at several conventions.

— — —

C. W. Ham, W4NYX, of Beam Street, Shelby, N. C., puts out a potent signal on 10-meter 'phone. — W6EH

A V.H.F. Man's VFO

A Frequency-Control Unit with N.F.M. for V.H.F. Use

BY C. VERNON CHAMBERS,* WJJEQ

• The VFO is considered to be an almost indispensable part of most modern stations where operation is concentrated on the lower frequencies but crystal control is still king on the v.h.f. bands. While operating habits and band occupancy are such that variable frequency control is not an absolute "must" for the v.h.f. man, it can be highly useful, especially when combined with a reactance modulator for narrow-band f.m. Here is a unit that was designed primarily with the specialized needs of the v.h.f. enthusiast in mind. The frequency-control dial is calibrated for direct reading 11, 10, 6 and 2 meters.

THE construction of a reasonably-good VFO for our lower-frequency bands is no great problem. With proper attention to the well-known factors governing oscillator stability, a frequency-control unit can be built that will give an entirely satisfactory account of itself on 20, 40 or 80. But when we listen to the high-order harmonics of some of these units we learn why most v.h.f. stations still stick to crystal control. Many a note that sounds acceptable on 3.5 Mc. is pretty fuzzy on its 15th harmonic, 52.5 Mc. And it usually takes no very careful listening on 144 Mc. to pick out the stations that are using other than crystal control.

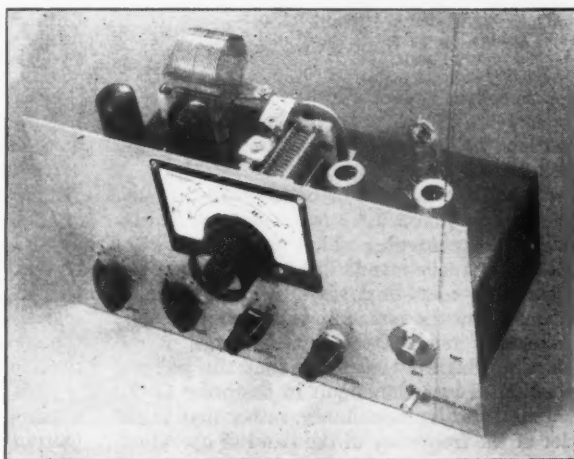
Even on 10 or 11 meters it is not too easy to obtain a pure d.c. note, especially when the oscillator frequency is modulated for narrow-band f.m. Completely clean signals are the exception rather than the rule for 10-meter n.f.m., a fact that has tended to give that form of modulation a bad reputation with the more critical listeners. N.f.m. doesn't have to sound fuzzy, but the fact remains that it often does.

The frequency-control unit described herewith has a degree of frequency sta-

bility that is adequate for high-order frequency multiplication, and the design of the audio portion is such that little or no hum is introduced in the reactance-modulation process. It has its own speech amplifier, designed specifically for the purpose, and the over-all gain is only just enough to provide adequate deviation for 10- and 11-meter operation. Somewhat more is available for 50-Mc. use, because of the additional frequency multiplication, and at 144 Mc. the maximum deviation is up to 30 kc., permitting use of the unit for semi-wideband f.m. on that band.

The Clapp Oscillator

The oscillator uses the now-famous Clapp circuit¹ which provides exceptional stability with a minimum of complication. The tuned circuit covers a range of 3395 to 4500 kc., with the oscillator doubling in its plate circuit. It is followed by a straight amplifier which builds the output up to about three watts. Output frequency is 6.75 to 9 Mc., in four ranges that are individually calibrated for multiplying into the 11-, 10-, 6- and 2-meter bands. The actual oscillator circuit is made up of the 6AG7 control grid, cathode and screen, in the manner of the electron-coupled type of oscillator, with the plate circuit operating on the second harmonic. The 6AG7 provides a fair degree of isolation between the plate and grid circuits, and having the output on the second harmonic makes the frequency of the oscillator almost completely independent of the tuning of the plate circuits of the oscillator and amplifier. Even at 50 Mc. the frequency changes



Front-panel view of the v.h.f. man's VFO.

* Technical Assistant, QST.

¹ "A High-Stability Oscillator Circuit," Technical Topics, May, 1948, QST, p. 42.

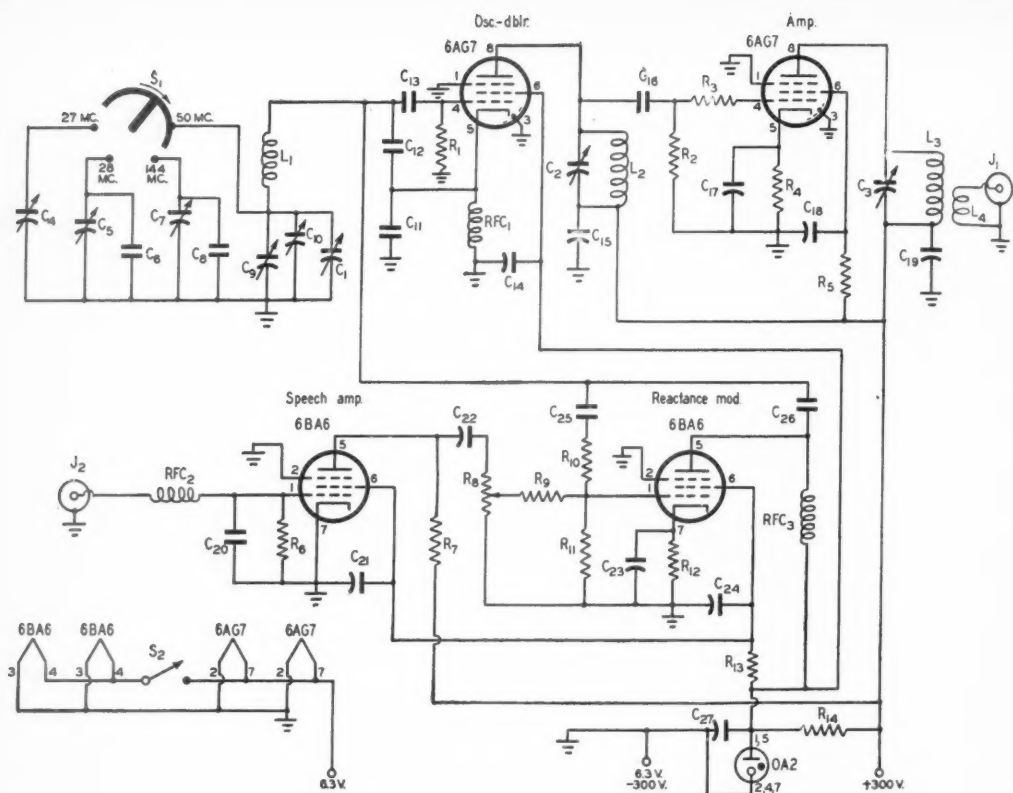


Fig. 1 — Circuit diagram of the f.m. control unit for v.h.f. use.

C₁ — 35- μ fd. variable, double spaced (Millen 21935).
 C₂, C₃ — 100- μ fd. variable (Millen 20100).
 C₄, C₅, C₇, C₉, C₁₀ — 2-30- μ fd. ceramic trimmer (Millen 27030).
 C₆ — 33- μ fd. silver mica.
 C₈ — 10- μ fd. silver mica.
 C₁₁, C₁₂ — 680- μ fd. silver mica.
 C₁₃ — 68- μ fd. silver mica.
 C₁₄, C₁₅, C₁₇, C₁₈, C₁₉, C₂₁, C₂₂, C₂₃, C₂₄, C₂₇ — 0.01- μ fd. 400-volt paper.
 C₁₆, C₂₀ — 100- μ fd. mica.
 C₂₅, C₂₆ — 47- μ fd. mica.
 R₁, R₉ — 0.1 megohm, $\frac{1}{2}$ watt.
 R₂, R₁₀ — 10,000 ohms, $\frac{1}{2}$ watt.
 R₃ — 47 ohms, $\frac{1}{2}$ watt.
 R₄ — 330 ohms, 1 watt.
 R₅ — 15,000 ohms, 2 watts.
 R₆ — 1 megohm, $\frac{1}{2}$ watt.

R₇, R₁₃ — 0.22 megohm, $\frac{1}{2}$ watt.
 R₈ — 0.5-megohm potentiometer.
 R₁₁ — 0.47 megohm, $\frac{1}{2}$ watt.
 R₁₂ — 470 ohms, $\frac{1}{2}$ watt.
 R₁₄ — 7500 ohms, 10 watts.
 L₁ — 24 turns No. 22 tinned wire, diameter $1\frac{1}{2}$ inches, length $1\frac{3}{4}$ inches (B&W 80 JCL with 18 turns removed).
 L₂, L₃ — 14 turns No. 24 e. wire, diameter 1 inch, length $\frac{3}{4}$ inch, wound on Millen 45000 form.
 L₄ — 3 turns No. 24 e., close-wound at bottom end of L₃.
 J₁, J₂ — Coaxial-cable jack (Jones S-101).
 RFC₁, RFC₃ — 2.5-mh. r.f. choke (Millen 34100).
 RFC₂ — 300- μ h. r.f. choke (Millen 34300).
 S₁ — 4-position progressive-shorting switch (Central lab GG modified; see text).
 S₂ — S.p.a.t. toggle switch.

less than the audio range as these circuits are tuned through resonance.

A reasonable amount of bandspread for each of the bands from 2 to 11 meters is provided by incorporating separate padders for each, switched by a front-panel control. The complete range of the oscillator could be covered by a single tuning condenser, but the spread for each band would be considerably reduced thereby. A glance at the schematic diagram will show that the padders are switched into the circuit in the order of the amount of padder capacitance, rather than in the order of the frequency of the band of operation.

The 50-Mc. band, requiring the lowest parallel capacitance, is the first position, followed by 144, 28 and 27 Mc., in that sequence.

Three ranges are available for calibrations on the National MCN dial. The 2- and 11-meter bands, requiring only 25 and 20 divisions respectively, are placed at opposite ends of the top scale. The 50-Mc. band occupies 55 divisions on the middle scale, and the 10-meter band 80 divisions on the bottom scale.

The second r.f. stage, also using a 6AG7, is a straight amplifier operating on 6.7 to 9 Mc. Output is taken off through a coaxial line which

may be plugged into the crystal socket of most transmitters using crystals in that range. Ordinarily the unit is used as a crystal substitute in this way, though it may be link coupled to the grid circuit of any low-powered stage operating in this range. Though the dial is calibrated only for 27 to 148 Mc., there is no reason why the unit could not be used for operation on 7 and 14 Mc. as well. It will also serve, of course, for those portions of the 220- and 420-Mc. bands that are in harmonic relationship with the oscillator frequency range.

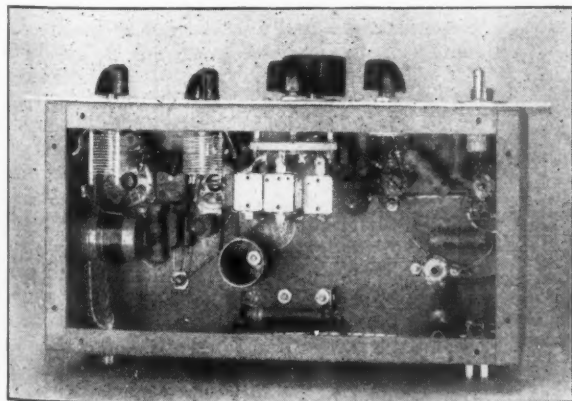
The Audio Portion

Frequency modulation is accomplished by means of a reactance modulator and a speech amplifier, both using 6BA6 miniature tubes. With a crystal microphone a deviation of approximately 500 cycles at the oscillator frequency is possible at ordinary speech levels. This is adequate for n.f.m. work on 10 or 11 meters, as a result of the eight times frequency multiplication. Approximately 10 kc. deviation is possible on 50 Mc., and as much as 30 kc. on 144 Mc., permitting semi-wideband f.m. on that band. This may be useful on 144 Mc., as receivers of the SCR-522 variety require considerable swing to produce an intelligible response. The deviation is controllable to any lesser swing by means of the control, R_8 .

A switch (S_2) is provided, by means of which the heaters of the speech stages may be cut off when c.w. or amplitude modulation is to be used. Cutting in the reactance-tube heater shifts the oscillator frequency noticeably, however, so it is advisable to leave S_2 closed if n.f.m. and other emissions are to be used on the same frequency. The deviation control should be backed off when c.w. or a.m. is in use.

Mechanical Details

The general arrangement of the parts should be clear from the photographs. The front view



Bottom view of the VFO unit. Note the mounting of the trimmer condensers on metal pillars to reduce vibration.

shows the panel arrangement, and the distribution of the principal components above the chassis. At the left are the oscillator and amplifier tubes, with the oscillator coil, L_1 , directly in back of them. The main oscillator tuning condenser and its vernier dial are at the center, with the audio and regulator tubes at the right. The microphone jack and modulator heater switch are at the lower right on the front panel, with the deviation control, the bandswitch, and the oscillator-plate and amplifier-plate tuning controls arranged across the panel in that order. The chassis is a standard $3 \times 5 \times 10$ -inch size, and the aluminum panel is 6 by 11 inches. A 5×10 -inch aluminum plate, not shown in the photographs, covers the bottom of the chassis. A rectangular hole is cut in this plate for access to the variable padders below the chassis.

The tuning condenser, C_1 , is a $35\text{-}\mu\text{fd}$. double-ended type, mounted at both ends on small angle plates, for mechanical stability. Padders C_9 and C_{10} are mounted directly on this condenser, and may be seen in the front view. The padders that are switched into the circuit are connected directly to the bandswitch, under the chassis. The ground ends of these trimmers are mounted on metal pillars, to insure solid connection to the chassis.

The bandswitch used required some modification. In its original form it has a disk that shorts out all unused contacts. This disk must be cut through the center, so that one-half may be removed. As may be seen from the schematic diagram, the connection between the oscillator coil and the switch is made to the No. 1 terminal, rather than to the regular wiper contact.

Power-supply connections are made through a plug and cable on the back wall of the chassis, and the coaxial output terminal is on the same wall at the opposite end. It will be noted that no power transformers are contained in the unit. The filament transformer and power supply were made external purposely, to avoid any possibility of a.c. modulation of the oscillator frequency through mechanical vibration or stray a.c. fields.

Calibration and Use

The power supply for the VFO should be well-filtered and capable of delivering 300 volts d.c. at 60 to 70 ma., and 6.3 volts a.c. at 1.9 amp. Socket voltage measurements are approximately as follows: 20 volts on the audio-tube screens, 150 volts on the 6AG7 screens, 50 and 150 volts respectively on the speech-amplifier and reactance-modulator plates, and 300 volts on the 6AG7 plates. Cathode current for the oscillator should be about 10 ma., and the output stage, at resonance, 30 ma.

Since the VFO dial settings should

(Continued on page 108)

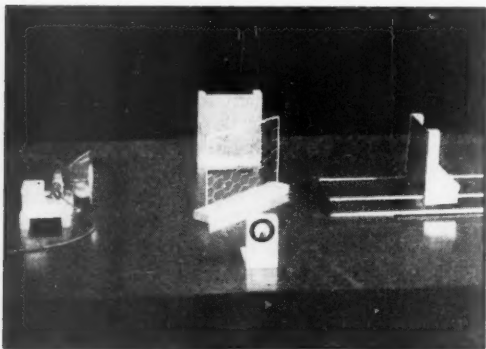
A Novel Microwave-Measuring Technique

Radio-Frequency Adaptation of Michelson's Interferometer

BY ROBERT E. GLADFELTER,* AND LOUIS K. DAVIS,* WØVWV

IN studying physical optics one is introduced to Michelson's Interferometer, an instrument that plays an important part in the study and measurement of light waves. Since light waves and radio waves are both transverse waves and tend to behave in the same manner, Michelson's Interferometer is adaptable to the investigation of either.

The purpose of the construction of a large-scale interferometer is to make use of the same principle that is involved in the original Michelson's



The complete laboratory set-up for radio-frequency measurement by means of the adaptation of Michelson's Interferometer includes the energy source, left, an intensity indicator, front, two mirrors, right and rear, and a half-reflecting screen, center.

Interferometer — i.e., interference — to study radio waves and to be able to measure the wavelength of a transmitter, as well as its frequency, if its wavelength is in the category of a few meters. Credit must be given to Mr. C. L. Andrews¹ for the original construction of the large-scale Michelson's Interferometer.

Interference in this sense has to do with light waves interfering with each other causing alternate dark and light portions. With radio waves also, one wave either tends to nullify or reinforce the effect of another wave. Two sources must be present having the same frequency and amplitude. Fig. 1 is a simple picture of how interference occurs. It is included to help clarify the reason for alternate increases and decreases in radiation received from the interferometer.

* Physics Department, Kansas State Teachers College, Emporia, Kans.

¹ "Microwave Optics," C. L. Andrews, *American Journal of Physics*, November-December, 1946, Volume 14, No. 6. Published by American Institute of Physics, 57 East 55th St., New York 22, N. Y.

Principle of Interferometer

In the schematic diagram, Fig. 2, the oscillator at the left is used as a source. M_h is the half-reflecting and half-transmitting mirror set at 45° to the axis of propagation. This mirror is made of 2-inch mesh chicken wire. The energy divides, part reflecting to M_1 and part going straight on to M_2 , where both paths of radiation are again reflected. That from M_1 reflects directly back through M_h and on to the intensity meter. That from M_2 reflects back to M_h where it is again reflected by M_h to the intensity meter. These two individual waves, traveling in the same direction, are now the basis for the interference obtained. By sliding M_2 in either direction the phase of Ray 1 is changed, thus governing what happens to the interference pattern at the intensity meter; i.e., the waves may nullify or reinforce each other. The waves are definitely polarized; therefore, the dipoles of both the oscillator and intensity meter must be parallel to each other.

Construction of Interferometer

The construction of the interferometer is relatively simple. It involves two aluminum mirrors and a piece of 2-inch mesh chicken wire. The mirrors are 1 foot square, and the half-reflecting mirror is 18 inches long and 1 foot tall. All three are mounted on wooden supports. The sliding mirror moves on two lubricated pipes mounted on a wooden base. It also has a handle in back to slide it back and forth along the track, as may be seen in the photograph of the complete set-up.

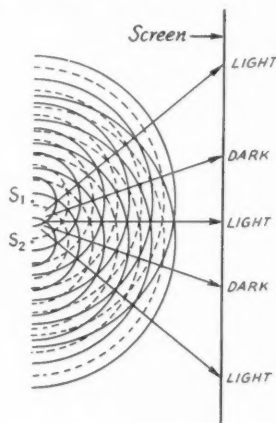


Fig. 1 — Diagram showing the operation of Michelson's Interferometer, as used in measuring light waves.

Construction of Intensity Meter

The intensity meter takes the place of an eye to detect the interference bands. It is a crystal detector hooked directly to a microammeter. There is a quarter-wave stub that acts as an insulator and provides a return for the d.c. meter current. A circular disk reflector is set one-fourth wavelength in back of the receiving dipole to reflect more radiation. Full scale on the meter is 20 microamperes; however, at close range the needle deflects considerably farther to the right past full

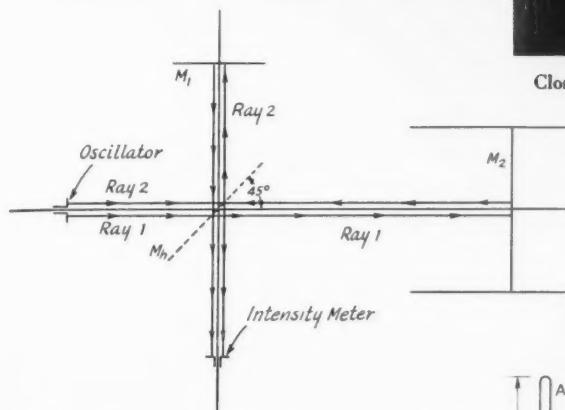


Fig. 2 — Plan of the set-up used for measuring radio waves, as described in the text.

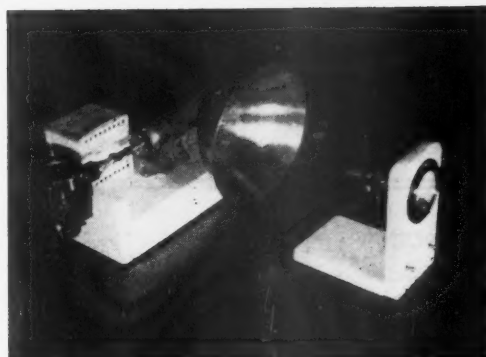
scale. The meter is sensitive enough for close-range experiments.

Dimensions can be found on the diagram of the intensity meter, Fig. 3. Photographs of the oscillator and intensity meter are also shown.

Operation and Technique of Measuring

To measure the wavelength, the interferometer is set up as shown in Fig. 2, with the source relatively close to M_h , in order to nullify the effect of stray radiation coming obliquely from the oscillator which would cause bothersome interference. The dipoles of the oscillator and intensity meter must be on the same level to get maximum intensity.

With the interferometer lined up correctly the meter will register the amount of radiation coming through. As M_2 is slid back the meter fluctuates because of increases and decreases in radiation reaching the dipole. By slow movement of M_2 the nodes and antinodes can be detected. At a node the meter will record a minimum; therefore the position of M_2 for each successive node can be recorded. These positions of minimum are spaced a half-wavelength apart along the scale beside M_2 . Each node occurs when there is a change in path difference of one wavelength. Since Ray 1 must travel down and back, a half-wavelength change of M_2 causes this required path difference. Refer to Fig. 2.



Close-up view of the transmitter and intensity meter.

Conclusion

The practical use of Michelson's Interferometer adapted to radio waves is not so much for studying interference, but for enabling one to measure the wavelength of a microwave oscillator, and consequently its frequency, in an extremely simple manner with accuracy depending upon the care used in measuring. An

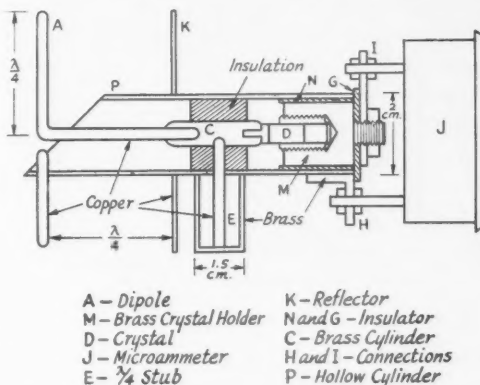


Fig. 3 — Detail drawing of the intensity meter used in the radio-frequency measurements.

average wavelength should be computed by making use of the full distance that the sliding mirror is capable of moving.

We want to express our sincere appreciation to Prof. Winston Cram under whose guidance this work was started and carried out.

Strays

W3JSJ reminds us of an old dodge for quickly obtaining a rough check on the frequency of a quartz crystal, which should prove handy to those fellows who grind their own. If you have an old t.r.f. receiver around, insert the blank into the detector coil and a "plop" will be noted as you tune across the crystal frequency.

I.A.R.U. News

FRANCE

The *Reseau des Emetteurs Français* announces the Second European DX Contest, which will be held November 27th-28th for c.w. and December 12th-13th for 'phone in celebration of the 25th anniversary of the first trans-Atlantic QSO on short-wave (100 meters), which took place on November 27, 1923, between 8AB in France and 1MO in the U.S.A. The R.E.F. offers commemorative certificates to participants in the contest who most nearly approach the working conditions of 8AB and 1MO and who will send R.E.F. a QSL confirmation of their contact on the 80-meter band between Europe and the rest of the world during the contest.

The January, 1924, issue of *QST* gives details of the equipment used by these stations and the conditions under which they worked. 1MO was using a haywire receiver, consisting of a regenerative detector and a one-stage audio amplifier, and a full-wave self-rectifying transmitter using two UV-203-As on each side of the cycle, running less than $\frac{1}{2}$ kw. 8AB had a brand new Grebe short-wave receiver and a transmitter with an unrectified 25-cycle input of 1 kw. Conditions were good, with strong signals both ways.

GREAT BRITAIN

The *Radio Society of Great Britain* on September 1, 1948, celebrated an important event in the history of the Society. That day marked the initiation of the regular transmissions of standard-frequency signals for use by British amateurs. The headquarters standard-frequency station, operating under the call GB1RS, transmits

marker signals on the hour from 0600 to 2400 GCT, on a frequency of 3500.25 kc. Transmissions are in Morse code at a rate of 12 words per minute. The initial announcement on the hour is followed by a long dash. While the accuracy of the frequency used cannot be certified until the transmitter has been in operation for a period of time, the goal is one part in a million (3.5 cycles at 3.5 Mc.)

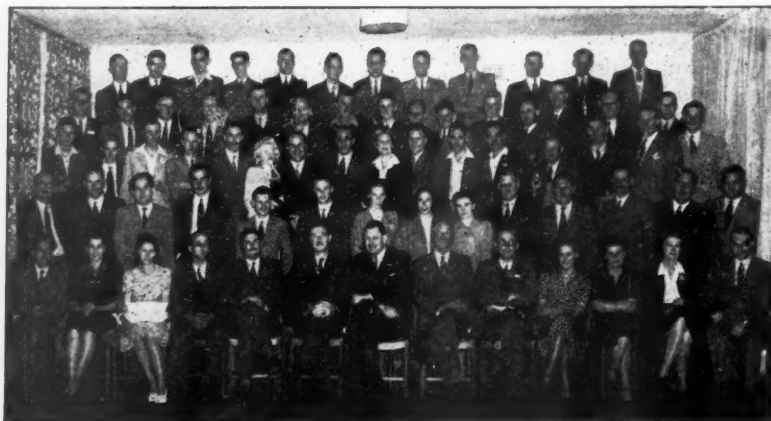
The establishment of this new service for British hams was made possible by the generosity of Sir Ernest Fisk, managing director E.M.I., Ltd., and numerous other concerns and individuals who contributed apparatus or assistance.

BELGIUM

The 25th anniversary of the founding of the *Union Belge des Amateur-Emetteurs* was celebrated on August 8, 1948, by an international hamfest at Ostend. Mr. Deloor, EBP2, founder of the *Reseau Belge*, the predecessor of U.B.A., and Mr. Mussche, ON4BK, reenacted their first QSO on the occasion of the founding of the society 25 years ago.

Mr. L. Richard, ON4UF, U.B.A.'s chairman, and Mr. Marcel Dupuis, ON4EY, district manager of West Flanders, related the history, in both French and Flemish, of the Belgian member-society of I.A.R.U. The hamfest ceremonies were concluded by congratulatory speeches on the achievements of the society and its members by L. J. v.d. Toolen, PA0NP, chairman of the Netherlands society, and Pierre Herbet, F8B0, council member of R.E.F.

(Continued on page 110)



The occasion of this happy gathering was the first postwar meeting of the Johannesburg, Pretoria and East Rand branches of the South African Radio League, which was held on February 27, 1948. The smiling gentleman in the exact center of the front row is ZS6Z, president of S.A.R.L.; on his right is ZS6A, vice-president of S.A.R.L. They are completely surrounded by well-known South African OMs, XYLs and YLs.

More on TVI Elimination

Improvements in Methods of Harmonic Reduction

BY PHILIP S. RAND,* WIDBM

• In this article the author describes the methods used to eliminate interference with television from a 75-meter 'phone transmitter, coming up with a harmonic-reducing kink that will improve things on any band. WIDBM's three transmitters, one each on 80, 20 and 15, all can be operated at 800 watts input without harmonic interference to any of the New York television channels — on a receiver sitting right next to the transmitter.

AFTER spending three months in television-interference experimentation last summer on 21 Mc. with a Class I experimental license,¹ we felt the urge to get back on 75-meter 'phone. We wanted to find out how serious the TVI situation was on this band, especially with receivers in the same building.

The television receiver on which we made the tests was an RCA STS30, a table model with a 10-inch picture tube. This set was installed in the operating room about four feet away from the relay rack housing the transmitter. Its antenna was a standard RCA dipole with reflector, mounted on a 30-foot mast and fed with 75 feet of 300-ohm ribbon. This antenna was directly under one end of the 75-meter antenna and the

300-ohm line paralleled the latter about 35 feet below. The TV set's i.f. amplifiers had been previously realigned to place the sound i.f. at 21.9 Mc., with the picture i.f. correspondingly higher. The inside of the cabinet had also been lined with copper screening to give some additional shielding to the set, and a bottom pan had been put on the chassis.

The 75-meter transmitter starts off with a BC-221-J frequency meter as the VFO, a 6AG7 buffer, and a 6V6 amplifier all on one chassis. Then follows an 829-B bandswitching amplifier which is link-coupled to a 4-125-A driver. The final amplifier consists of a pair of 250-THs in push-pull, normally run at 700 watts input. These three stages are all on separate chassis. The final is link-coupled to a three-wire folded-dipole antenna through a 600-ohm open-wire transmission line. This antenna is 65 feet high with its center directly over the house so that the feeder drops vertically down to the shack.

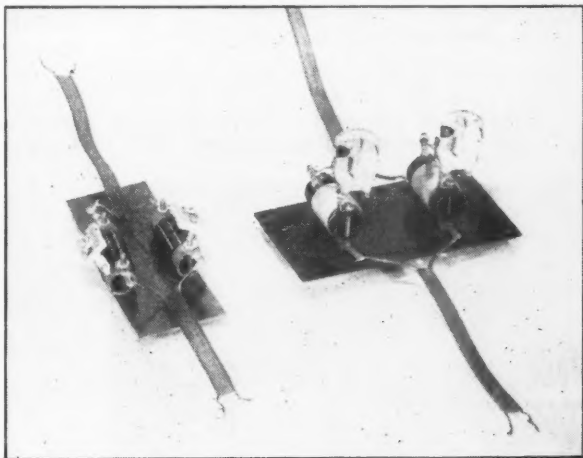
In the period since the appearance of the TVI article in May *QST*² I have become completely surrounded by television receivers. This is mentioned only to emphasize the unbelievable growth of television and its acceptance by the general public — even in a locality that is outside the "rural-coverage area," defined by FCC as the area in which the signal strength is 500 μ v. per meter or better. TV signal strengths in Norwalk, Connecticut, were measured at 9 to 294 μ v. per meter. With TV stations being built all over the country it will only be a matter of a year or two before almost every ham in the country will

*Laboratory of Advanced Research, Remington Rand, Inc., South Norwalk, Conn.

¹ See report on these tests elsewhere in this issue. — Ed.

² P. S. Rand, "TVI Can Be Reduced," *QST*, May, 1948.

Double wavetraps for filtering out the fundamental signal at the input terminals of a television receiver. Each trap is tuned to the transmitting frequency. The L/C ratio is not particularly critical but the traps will work better if they are low-loss.



find himself similarly surrounded. Therefore it is of utmost importance that everyone find out all he can about TVI, its cause and cure.

One thing is certain: It is a waste of time to modify your present rig just enough so it won't bother a TV set a couple of city blocks away. Next month there will be a new one only one block away, and then one two houses away, and finally all your neighbors will have television. You might just as well undertake the whole job while you're at it. Of course, there will be exceptions. For example, if you operate maritime-mobile in the middle of the Atlantic or live in a shack in the Arizona desert, you may be able to ignore TVI!

So it was with fingers crossed that I pushed the

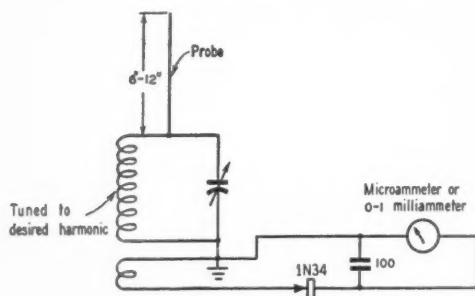


Fig. 1 — The "Little Gem," "gimmick," or crystal wavemeter. By any name it's an essential instrument in tracking down harmonics. The probe is useful for poking through shielding to get a reading.

"on" button on the 75-meter rig — and watched the picture on the screen disappear. A neon bulb would light on the TV chassis. I could pull arcs off the TV feeders with a lead pencil and could read 4-Mc. r.f. on the sewer pipe in the bathroom. I checked with my neighbor across the street and found he had lost his picture on all channels, too. Further telephoning, however, showed that the interference was all located within a 500-foot radius.

Preliminary Cleaning Up

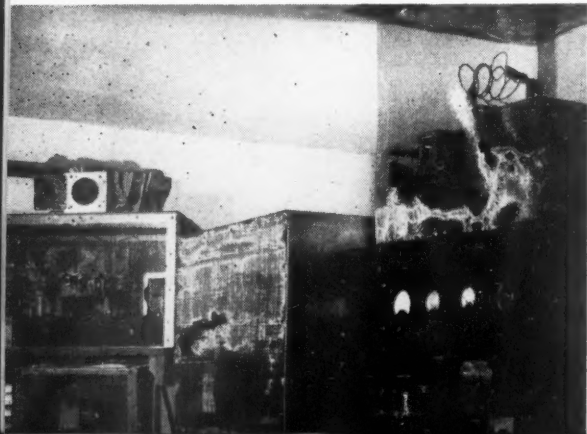
The obvious first step was to get rid of the r.f. on my TV set. The TV antenna was moved to the backyard so the feeder could come in at right angles to the transmitting antenna. At the

same time a twin-coax feeder was also installed and fed down through the center of the mast and run to the house underground. This removed the terrific amount of r.f. from the TV set, but there was still no picture on any channel. A little figuring showed that the 6th harmonic would land right in the picture i.f. and the 14th and 15th harmonics would land on Channel 2. In fact there could be a harmonic every 4 Mc. all through the TV channels. Checking with the "Little Gem" showed slight traces of the 6th and 15th harmonics near the front end of the final tank condenser and in the power leads.

Next, a dummy lamp load was substituted for the antenna but the TVI was still there. At this point the final amplifier was turned off and a lamp load put on the 4-125-A driver. There now was no TVI on any channel. How was the driver different than the final? It had been filtered, trapped and shielded as described in May *QST*.² In fact all the rest of the rig had had this treatment. This indicated that possibly the treatment that had been so effective on 10 meters would work equally well on 75. The following evening, with the help of W1KHL, the final was filtered and shielded with copper screening.

The transmitter could now be operated with 800 watts input into a lamp load with no TVI on the receiver four feet away. But on connecting the antenna again all channels still were jammed. The interference was now worse on some channels than on others, and varied all the way from severe crosshatching to what looked like complete blocking. With the TV antenna disconnected the screen looked fairly clean, so it was decided to equip the TV-receiver feeder with double wave-traps, one set tuned to 24 Mc. and the second to 4 Mc. This cleaned up some of the higher channels but had no effect on the lower ones. Apparently the TVI was being caused by a mixture of 4 Mc., 24 Mc. and 60-80 Mc.

The a.c. wiring in the house was still loaded with 4-Mc. r.f., induced by the field from the antenna directly overhead. Therefore an r.f. filter similar to the one shown in Fig. 3 of the May article was wound up for the a.c. line feeding the TV receiver. This further cleaned up Channels 4, 7, 11 and 13, but left Channels 2 and 5 with severe crosshatching. As this looked like harmonic interference a six-inch wire antenna or probe was



Copper screening makes a good r.f. shield but is definitely not photogenic — although it doesn't look bad "in the flesh." These three amplifiers show three different ways of constructing shields of window-screen material.

added to the "Little Gem," as shown in Fig. 1, and a small hole was drilled in the front panel so the probe could be poked in under the front end of the final tank condenser. Sure enough, there was still a little r.f. at 60 Mc. and some more around 80 Mc.

The frame of the tank condenser was by-passed for r.f. only at the rear end, so a 0.003- μ fd. 5000-volt mica condenser was installed to by-pass the front end. This partly cleared Channel 2, but made no change in the interference in Channel 5. We debated installing harmonic traps in the plate leads as had been done in our 10- and 20-meter finals; however, harmonic traps are a little fussy to tune so we preferred to avoid using them if possible.

Short-Circuiting the Harmonic

While reneutralizing the 250-THs to be sure they were on the button we happened to check their interelectrode capacities in the *Handbook* and noticed that the plate-to-filament capacity was only 0.7 μ fd. This started us thinking. How could any harmonic r.f. get to the filament from the plate? Certainly not through a condenser of only 0.7 μ fd. It must flow through the tank circuit and back.

At 7 and 14 Mc. a 3.5-Mc. tank circuit has very low impedance and thus harmonics in this range tend to be shorted to ground. However, in the 56- to 80-Mc. range there is enough inductance in the plate lead and condenser frame to be series-tuned to one of the higher harmonics. Just which harmonic or harmonics are built up this way depends on the layout of parts, physical shape of condensers, length of leads, length of r.f. filament returns, and so on.

But suppose we give the harmonic r.f. a nice easy direct path through, say, a 50- μ fd. vacuum condenser connected directly from plate to filament. A quick check showed this would be a reactance of only 40 ohms at 80 Mc., compared with 2500 ohms for the plate-filament capacity of the tube. Well, it was worth a try. So two of the SCR-274 (ARC-5) antenna vacuum condensers were temporarily connected, one from each plate cap to each filament center-tap. Lo and behold, no TVI on any channel — with 800 watts 4 feet from the TV receiver. Because of the added capacity it was necessary to use a 7-Mc. coil to tune the tank to resonance.

The use of vacuum condensers to help control harmonics is very desirable from several standpoints. Their construction — concentric cylinders in a vacuum with glass insulation and heavy connectors — makes them have low losses, high voltage breakdown, and low inductance. They add a substantial amount of capacity to the tank circuit in an efficient, small, easy-to-mount form. They may be connected from plate to filament, from grid to filament, or both. Fig. 2-A shows a typical single-ended r.f. amplifier or one half of

a push-pull amplifier. Capacity C_{pf} is the plate-to-filament capacity of the tube and amounts to 0.7 μ fd. for a 250-TH. C_{gf} , the grid-to-filament capacity, is 5 μ fd. The heavy lines show the path that the harmonic takes to get from either the plate or grid back to the filament. This long path usually has about the right amount of inductance and capacity to be series-resonant in

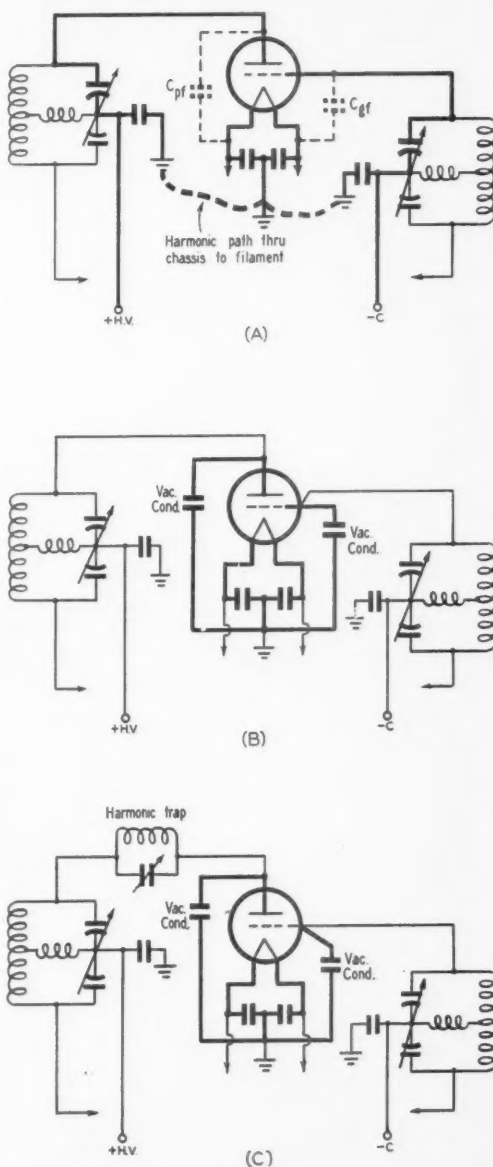


Fig. 2 — The harmonic return circuits are shown by the heavy lines. Vacuum condensers, because of their low inductance, are especially good for shorting the harmonics directly from plate (the most important point) to filament and grid to filament. A trap in the plate lead, as shown at C, will prevent a particular harmonic from getting into the tank circuit.

the range 56-100 Mc. In addition to the path in heavy lines the harmonic current undoubtedly divides and partly flows through the tank coil from where it is coupled to the antenna.

Fig. 2-B shows the use of vacuum condensers from plate to filament and from grid to filament to provide short, low-inductance paths for the harmonic current. Although the greater part of the harmonic goes directly to filament through the vacuum condenser a small part probably will continue to flow through the tank circuit. In Fig. 2-C a harmonic trap has been installed in the plate lead, following the vacuum condenser, to prevent the harmonic from getting into the tank.

Now don't get me wrong and assume that all your TVI problems will be licked if you corner the surplus market on 50- μ fd. vacuum condensers. You can't cure TVI by any one means. The last thing you try, the one that finally cures the TVI completely, would have helped only a little if it had been tried first. You have to stop all the leaks.

TVI Review

Let's go over once again some of the most important steps to be taken in licking TVI:

Design and layout:

- 1) Do your frequency multiplying in very low-power stages and build up the power on the output frequency with "Class B" amplifiers — amplifiers biased to cut-off or less.
- 2) Lay out the final amplifier for the shortest possible r.f. path from plate to cathode.
- 3) Add capacity directly from plate to cathode on each tube in the final. Vacuum condensers are ideal for this purpose because of their low in-

ductance and physical shape. This step is particularly important with triodes because their plate-filament capacitance is usually very low. The added capacitance is part of the tank circuit, so the tank coil must be made correspondingly smaller.

4) Shield all stages (copper screening is OK) to prevent direct radiation of harmonics.

5) With 'phone, use of f.m. instead of a.m. will lessen interference because it eliminates "modulation bars" in the picture. Carrier interference is the same in either case, however.

Operating:

1) Make sure that the final is perfectly neutralized.

2) Keep the grid bias as low as possible. The closer to cut-off the better, provided the amplifier will modulate properly when a.m. is used.

3) Don't overdrive. Keep the grid current below ratings — just enough for proper modulation, when a.m. is used.

4) Clean up key clicks and sideband splatter. These can ruin the picture even when there is no harmonic interference.

Cleaning up off-frequency radiation:

1) Make sure that the rig is completely free from parasitic oscillations.

2) Filter all wiring before it leaves the chassis so harmonics will not be radiated from the power and control leads. The a.c. line feeding the final filament transformer needs especially good filtering. It is also advisable to have one "main" line filter for the entire a.c. supply to the set.

3) In 14- and 28-Mc. transmitters, install parallel-tuned traps (high-C) in each plate lead to trap out the desired harmonic.

In the antenna system:

1) Use a separate antenna tuner. It not only helps discriminate against harmonics coupled by ordinary means but also tends to reduce coupling through stray capacity.

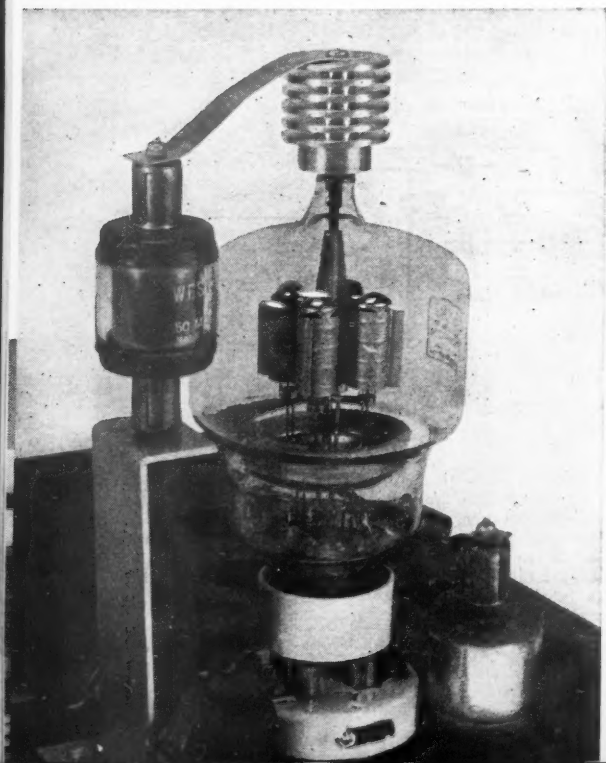
2) Use stubs on the transmission line to trap out harmonics in the line. Stubs are sometimes helpful and sometimes not, but are worth a trial if there is still interference after all the steps listed above have been taken.

At the TV receiver:

1) If your fundamental signal overloads nearby receivers, install parallel-tuned traps in each feeder lead right at the receiver input terminals. These traps should tune to your fundamental.

2) Install an a.c. line filter if the receiver is close enough so that there is evidence of fundamental-frequency r.f. on the a.c. wiring.

(Continued on page 114)



Showing how the vacuum condensers are mounted alongside a tube. The leads connecting the condensers should be as short as they can be made.

QST for

Happenings of the Month

WHAT BANDS AVAILABLE?

Below is a summary of the U. S. amateur bands on which operation is permitted as of November 1st. Future changes will, as usual, be announced by W1AW bulletins. Figures are megacycles. AØ means an unmodulated carrier, A1 means c.w. telegraphy, A2 is m.c.w., A3 is a.m. 'phone, A4 is facsimile, A5 is television; n.f.m. designates narrow-band frequency- or phase-modulated radiotelephony; and f.m. means frequency modulation, 'phone (including n.f.m.) or telegraphy.

3,500-4,000	-A1
3,850-4,000	-A3, Class A only
3,850-3,900	-n.f.m., Class A only
7,000-7,300	-A1
14,000-14,400	-A1
14,200-14,300	-A3, Class A only
14,200-14,250	-n.f.m., Class A only
27,100-27,430	-AØ, A1, A2, A3, A4, f.m.
28,000-29,700	-A1
28,500-29,700	-A3
28,500-29,000	-n.f.m.
29,000-29,700	-f.m.
50.0-54.0	-A1, A2, A3, A4
51.0-52.5	-n.f.m.
52.5-54.0	-f.m.
144-148	-AØ, A1, A2, A3, A4, f.m.
220-225 ¹	-AØ, A1, A2, A3, A4, f.m.
420-450 ²	-AØ, A1, A2, A3, A4, A5, f.m.
1,215-1,300	-AØ, A1, A2, A3, A4, A5, f.m.
2,300-2,450	
3,300-3,500	
5,650-5,925	AØ, A1, A2, A3, A4, A5, f.m.,
10,000-10,500	Pulse
21,000-22,000	
All above 30,000	

¹Until January 1, 1952, FCC may order this band vacated in certain areas if it is required for distance-measuring equipment; in which case, amateurs in such areas only may employ 235-240 Mc. in lieu thereof.

²Peak antenna power must not exceed 50 watts.

SMITH SUCCEEDS DELLINGER AS C.R.P.L. HEAD

For over two-and-a-half decades, amateur radio has enjoyed closer relations with the National Bureau of Standards than with any other Government agency outside the military — save FCC itself. From the fading tests of 1920 through the present 28-Mc. observing project, the coöperation between the Radio Section of the Bureau of Standards and ARRL has been extensive and mutually profitable. It is especially pleasant, therefore, to pay tribute to Dr. J. Howard Dellinger, world-renowned allocation and propagation authority who retired earlier this year as chief of the Central Radio Propagation Laboratory of the Bureau, and to his recent successor, Dr. Newbern Smith.

Dr. Dellinger, perhaps best known for his dis-

covery of the coincidence of sunspot activity and radio fade-outs, the so-called Dellinger Effect, is a native of Cleveland, Ohio. He was a student at Western Reserve University from 1903 to 1907, received his bachelor of arts degree from George Washington University in 1908 and his Ph.D. degree from Princeton in 1913. In 1932, he was presented with a doctorate of science by George Washington University.



Dr. J. Howard Dellinger

In 1907 Dr. Dellinger became a member of the staff of the Bureau of Standards. Four years later, when the SS *Titanic* tragedy brought the immediate practicality of radio to public attention, he initiated radio research at the National Bureau of Standards and was named Chief of the Radio Section when it was established in 1919. One of his early experiments led to the practice of broadcasting market reports in Morse code by the Department of Agriculture in 1921, the first regularly-scheduled broadcasts in the world. It was he who conceived the idea and initiated the standard radio-frequency broadcasts from WWV. In 1928 and 1929, Dr. Dellinger was loaned by the Bureau to the Federal Radio Commission as its chief engineer.

The service rendered by Dr. Dellinger during World War II was especially noteworthy. At the beginning of the war, he was chosen by the Armed Forces Joint Communications Board to set up and direct the work of the Interservice Radio Propagation Laboratory. The assignment of IRPL was to collate data which made it possible to predict radio characteristics for the armed services. In 1946 IRPL was reorganized as the

Central Radio Propagation Laboratory and its prediction service made available for civilian as well as military use, with Dr. Dellinger as its chief.

Author of numerous papers on radio and allied subjects, Dr. Dellinger is also radio editor for *Webster's Dictionary*. He is a member of the Institute of Radio Engineers, the Washington Academy of Sciences, American Geophysical



Dr. Newbern Smith

Union, and an honorary member of the *Associazione Italiana de Aerotecnica*. He was IRE vice-president in 1924, its president in 1925 and received the IRE Medal of Honor in 1938. He served as vice-president of the Washington Academy of Sciences in 1935, 1939 and 1941. He is vice-president of the International Scientific Radio Union and still serves as chairman of both the Radio Technical Commission for Aeronautics and the Radio Technical Commission for Marine Services.

In the field of radio legislation, in which he has been active since 1916, Dr. Dellinger's career encompasses practically all of the legislative parleys in that period. The veteran Bureau of Standards radio chief has been an outstanding American technical expert and scientist at all major conferences and meetings, including those of the International Radio Consultative Committee, and has headed many propagation and scientific committees at international conferences which have contributed immeasurably to the progress of international communications.

Dr. Dellinger also served since 1922 as representative of the Department of Commerce on the U. S. Government Interdepartment Radio Advisory Committee, for whose creation and success he is one of those largely responsible, and was twice its chairman, in 1941-1943 and 1946-1948. He was a member of innumerable specialized technical committees. The studies of one of these, on communications policy in 1934, was embodied in the Communications Act of 1934.

Over all these years, he has been one of amateur radio's staunchest friends; at Washington, at international conferences, he has always expressed recognition of the value and utility of amateur radio and its contribution to the art.

It is only by appraising the duties which Dr. Dellinger is relinquishing that we can sense any degree of retirement; he plans to continue to act as radio consultant and advisor for a number of organizations and companies. With our gratitude to Dr. Dellinger for his valued friendship, we tender also our best wishes and the hope that his retirement years will be long, full and happy.

Dr. Newbern Smith, successor to Dr. Dellinger as chief of CRPL, brings to the Laboratory a background and record of achievement which admirably qualifies him for his new post. Widely acclaimed for his considerable research in ionosphere measurements, oblique-incidence radio transmission and radio critical frequencies in relation to solar eclipses and sunspot cycles, he served as technical head of IRPL during the war and, in that capacity, participated in conferences in London, Ottawa and Washington, followed by activity in later conferences in Geneva, Stockholm and Atlantic City. Dr. Smith has been with the National Bureau of Standards since 1935, at which time he was a physicist in the radio section. In 1946, he was named assistant chief of CRPL, a position he held until his new appointment.

Born in Philadelphia in 1909, Dr. Smith attended the University of Pennsylvania where he received his bachelor's degree in 1930 and his master's degree in 1931, both in electrical engineering. In 1935, he received his doctorate of physics from the same university. In 1930, he was awarded the Moore Fellowship in Electrical Engineering at the University of Pennsylvania and was an assistant instructor in electrical engineering in 1931 and a research assistant in 1933. The following two years he was a physics instructor at the Philadelphia College of Osteopathy. Dr. Smith was also a part-time member of the faculty of George Washington University and is a senior member of IRE and of numerous honorary fraternities.

An old-timer in ham circles, Dr. Smith was licensed in 1924 as 3QY, later W3QY, which expired in 1931 during the time he was on one of his many overseas trips. Several years later, he was able to squeeze in a limited amount of amateur activity with the call W3CHA. His extensive professional activities have taken so much of his time that he hasn't found time to get on the air in recent years; the major portion of his recreational time at present is spent in flying. However, he hopes to kill two birds with one stone in the near future by engaging in amateur aeronautical mobile operation, combining his flying and hamming. To Dr. Newbern Smith, then, we extend hearty good wishes for success in all things, including best DX and happy landings.

EXAMINATION SCHEDULE

The Federal Communications Commission will give amateur examinations during the first half of 1949 on the following schedule. Remember this list when you need to know when and where examinations will occur. Where exact dates or places are not shown below, information may be obtained, as the date approaches, from the Engineer-in-Charge of the district. *Even stated dates are tentative and should be verified from the Engineer as the date approaches.* No examinations are given on legal holidays. All examinations begin promptly at 9 A.M. except as noted.

Albuquerque: Mar. 29.
Amarillo, Tex.: Apr. 5.
Anchorage, Alaska, 39 U. S. P. O. and Courthouse: By appointment.
Atlanta, 411 Federal Annex: Tuesday and Friday at 8:30 A.M.
Bakersfield, Calif.: Some time in February.
Baltimore, 508 Old Town Bank Bldg.: Monday through Friday. When code test required, 8:30 A.M.

• Since the war many countries of the world have set up currency restrictions which either prohibit the sending of money outside their boundaries, or make it practically impossible. This has meant that hundreds of amateurs in other lands do not normally have the opportunity to renew their ARRL memberships and receive *QST* regularly. Yet to them *QST* is the lifeline of contact with American and world-wide amateur radio. As one of them said, "I'd gladly forego my bread ration if instead I could get *QST* regularly."

At the end of the war ARRL did in numerous instances grant membership and *QST* to prewar members overseas on a credit basis, but of course we couldn't carry membership-subscriptions on that basis indefinitely and, in practically all cases, we have been regretfully obliged to discontinue these arrangements. It has occurred to us that perhaps American amateurs and club groups might wish this year to make a "care" package gift in the form of *QST* for Christmas. If it's something you'd like to do, we'll be glad to make necessary arrangements. The foreign membership dues are \$5. If you have a particular DX buddy in mind, give us his name — and complete address. If you have no special name, we can arrange to apply your remittance to a membership-subscription for a foreign amateur who cannot send his own money but wishes to renew. We'll let you know what amateur we select. And of course we'll send the recipient of your gift an appropriate note to tell him who his American patron is. Address ARRL, 38 La Salle Road, West Hartford 7, Conn.

Bangor, Me.: Some time in April.
Beaumont, Tex., 329 P. O. Bldg.: Thursday, and by appointment.
Billings, Mont.: May 2.
Birmingham: Jan. 5, Apr. 6.
Bismarck, N. D.: April 13.
Boise: Some time in April.
Boston, 1600 Customhouse: Monday through Friday, 8:30 A.M.
Buffalo, 328 Federal Bldg.: Thursday.
Butte, Mont.: Apr. 29.
Charleston, W. Va.: Some time in March and June.
Chicago, 246 U. S. Courthouse: Friday.
Cincinnati: Some time in February and May.
Cleveland, 541 Federal Bldg.: First and third Fridays each month, also by appointment.
Columbus, Ohio: Some time in January and April.
Corpus Christi: Mar. 10, June 9.
Cumberland, Md.: Apr. 14.
Dallas, 500 U. S. Terminal Annex: Monday through Friday.
Davenport: Some time in January and April.
Denver, 521 New Customhouse: First and second Thursdays each month, also by appointment.
Des Moines: Jan. 13, Apr. 7.
Detroit, 1029 New Federal Bldg.: Wednesday and Friday.
El Paso: Mar. 22.
Ft. Wayne: Some time in February and May.
Fresno: Mar. 16, June 15.
Grand Rapids: Some time in January and April.
Hartford, Conn.: Some time in March.
Hilo, T. H.: Apr. 12.
Honolulu, 609 Stangenwald Bldg.: Monday.
Houston, Tex., 324 U. S. Appraisers Stores Bldg.: Tuesday and Friday.
Indianapolis: Some time in February and May.
Jacksonville: April 16.
Juneau, Alaska, 7 Shattuck Bldg.: By appointment only.
Kansas City, 838 U. S. Courthouse: Friday, also by appointment.
Klamath Falls, Ore.: Some time in May.
Knoxville, Tenn.: Mar. 9, June 8.
Las Vegas, Nev.: Some time in April.
Libue, T. H.: Apr. 26.
Little Rock: Jan. 19, Apr. 20.
Los Angeles, 539 U. S. P. O. and Courthouse Bldg.: Wednesday at 9 A.M. and 1 P.M.
Memphis: Mar. 9, June 8.
Miami, 312 Federal Bldg.: Monday and Thursday.
Milwaukee: Some time in January and April.
Mobile: May 18.
Nashville: Feb. 9, May 11.
New Orleans, 400 Audubon Bldg.: Monday through Friday; when code test required, Monday, Tuesday, Wednesday at 8:30 A.M.
New York, 748 Federal Bldg., 641 Washington St.: Monday through Friday.
Norfolk, 402 Federal Bldg.: Monday through Friday; when code test required, Friday only.
Oklahoma City: Jan. 20-21, Apr. 25-26.
Omaha: Jan. 20, Apr. 14.
Philadelphia, 1005 Customhouse: Monday through Friday, 9 A.M. and 1 P.M.
Phoenix, Ariz.: Some time in April.
Pittsburgh: Feb. 8-9-10, May 3-4-5.
Portland, Me.: Some time in April.
Portland, Ore., 406 Central Bldg.: Friday at 8:30 A.M.
Reno: Apr. 20.
Roanoke: Apr. 2.
St. Louis: Feb. 10, May 12.
St. Paul, 208 Uptown, P. O. Bldg.: Friday.
Salt Lake City: Mar. 16, June 15.
San Antonio: Feb. 10, May 12.
San Diego, 230 U. S. Customhouse: By appointment.
San Francisco, 323-A Customhouse: Monday and Friday; Class A, Monday through Friday.
San Juan, P. R., 323 Federal Bldg.: Thursday.
Savannah, 214 P. O. Bldg.: By appointment.
Schenectady: Mar. 9-10, June 8-9.
Seattle, 801 Federal Office Bldg.: Friday, 8 A.M.

(Continued on page 114)

The Navy and the Amateur

An Address by the Chief of Naval Communications at the ARRL National Convention

BY REAR ADMIRAL EARL E. STONE,* USN

Distinguished Guests, Ladies and Gentlemen:

I am honored to have been invited here to address you during your fifth American Radio Relay League National Convention. My pleasure on this occasion is especially due to the friendliness, respect, and active cooperation that has existed between the ARRL and the Navy for many years. I expect that this same fine spirit will continue in the years ahead, for our mutual benefit, and in the national interest. There is an added reason for my pleasure at being here today. This is the first time I have ever been on this platform — but this great building is very familiar to me — for I grew up in Milwaukee. Of course, it's been many a year since 1914 when I went to Annapolis and put on my first Navy uniform. But there's always real pleasure in coming back home again. But now let me tell you of the Navy's great interest in, and great respect for, you — the members of ARRL.

As you all know, many amateurs came into the Navy both as officers and as enlisted men during World War II. To them, I know that we owe a great deal — for their contributions to the successes which the Navy and the other services attained during that war. Those amateurs who entered the Naval service and who, previously, through their devotion to amateur radio had developed into good c.w. operators and good radio technicians, were able to fill important billets immediately upon mobilization, often without any additional training. The Navy's communication and electronics requirements upon mobilization were literally beyond normal expectations. The fine training which so many amateurs had voluntarily given themselves proved invaluable to the military services, especially during the mobilization period before our wartime training programs could become effective.

The enormous strides which have been made in the development of communications materiel — I mean the development of various mechanical means of transmission and reception, and of voice transmission and reception — have had a tendency to produce radio personnel who may be inclined to underestimate the importance of certain fundamentals. The Navy still considers c.w. operation to be the fundamental requirement of a radio operator. Today, if you have the money, it is easy to purchase radio transmitters and receivers complete — but the young amateur of today may fail to learn much that is fundamental if he passes up the opportunity of assembling some of his own equipment, not to mention missing the thrill that goes with building your own radio facilities. The newcomer in the amateur field will do well to follow in the footsteps of his older brother and learn by cutting and trying. The "know-how" which the amateur acquires by personally testing and experimenting is the priceless ingredient that makes the amateur the vitally important man in an emergency. "Know-how" coupled with resourcefulness has frequently meant success when success was urgently required.

I should like to state that no matter how mechanized and automatic Naval communications may become, I feel that we shall always need manual and voice operators (brass

pounders and radiotelephone technicians) when the going is toughest. As one of my officers in Washington recently put the same thought: The "Phi Beta Kappa Key" boys will always be deserving of much praise for their various accomplishments, but in military communications the "Tap-a-Key" and "Cock-an-Ear" boys are the ones who really deserve a pat on the back.

A quick glance at a recent issue of the amateur call book indicates that there are perhaps more radio amateurs at the present time than ever before. This is a healthy and most welcome condition. I would like to recommend that each of you do everything practicable to sustain this newly-aroused interest. As you no doubt know, this increase in the number of licensed amateurs demands the greatest efficiency in utilization of available amateur frequency allocations. I submit for your serious consideration that the use of c.w. radiotelegraphy should be encouraged. The reasons for this are that: (1) More channels per kilocycle of spectrum can thus be obtained; and what is more important (2) amateur bands are rendered less vulnerable to reduction by reason of inefficient use, and (3) from the military viewpoint, more trained c.w. operators will be available to the three services in an emergency.

A quick check before I left Washington showed that we have a list of about 8500 licensed amateurs who were in the Naval service either as officers or enlisted men during the last war. I have talked with many officers who were charged with important Navy communication projects during that war, and I have had some experience myself in connection with advance-base communication planning, construction, and installation work in the Far Pacific. Usually on each project we had a very few experienced Navy regulars plus many hands to do the pick-and-shovel work. Fortunately there usually were also some amateurs or other experienced men present, and often it was their "know-how" and "self-starter" characteristics that made the project successful. Naturally, I want to encourage and support you amateurs since I know first hand how essential you are to our national security and defense. I honestly feel that as a group, and individually, you deserve the "can do" title, and that you will certainly continue to deserve that appellation of accomplishment and praise if you adhere to the old fundamentals and keep your ranks full of patriotic Americans.

It is our policy in the Navy actively to support the activities and the program of the amateurs. We do so at international radio conventions and at home with Congress, the Federal Communications Commission, and with other Government departments and agencies. We shall continue to do so. As you doubtless know, a large percentage of our Naval Reservists, particularly in our electronic-warfare programs, are also amateurs in good standing. We constantly urge our licensed amateurs to use the Naval Reserve communication equipment on amateur business in the amateur bands. They must, of course, be licensed, and in that rôle they operate this equipment using amateur call signs and procedures. Most of them have been issued distinctive amateur calls containing a Naval Reserve identification, and their ham



* Chief of Naval Communications, U. S. Navy, Washington, D. C.

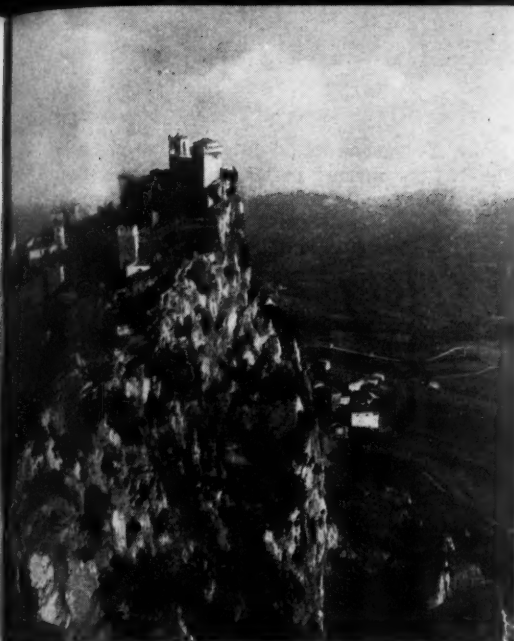
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DX Holiday in San Marino

BY GIANCARLO MARTELLI,* IIPL,
AND STELIO RIGUCCI,** IIHR

all indecision — we had to go to San Marino.

After deciding on a date for our venture, we notified our ham friends in the United States, loaded our car with a portable rig and a receiver, and started from Urbania, Italy, early on the morning of Saturday, August 21st. Unfortunately, we had left our road map at home, so we advanced through driving rain toward San Marino wholly dependent upon the instructions of wayfarers. We soon found ourselves in a labyrinth of mountain roads, meeting only an occasional farmer or shepherd. One shepherd told us our goal was 30 miles away; a half hour later another informed us we had 50 miles to go! After hours of what seemed aimless driving, the top of Mt. Titano broke through the rain clouds. M1-land at last! And an especially welcome sight for IIHR whose arms were very weary after driving the car around the many tortuous mountain curves. The unguarded border was crossed without incident, and it wasn't long before we had

THE untimely passing early this year of our good friend Francini, M1A, whose brief period of operating had just started to put San Marino on the postwar DX map, left that tiny republic without an amateur active in DX circles. There is one other amateur in the country, M1B, but he is interested mainly in rag-chewing on 7-Mc. 'phone.

Continual inquiries by amateurs in the States as to the possibility of working San Marino led us to give thought to a possible "expedition" to that "rare" country. Discussing our idea with W1FH, W2BXA and W3JNN during rag-chews, we were further encouraged to go ahead with the necessary groundwork.

San Marino's 38 square miles, 2500 feet high atop Mt. Titano in central Italy, is but a pin point on the map of southern Europe. Established in the year 1231, the country lays claim to being the oldest republic in Europe. It maintains an army, issues its own stamps and coins, and makes foreign treaties. Its 12,000 inhabitants — mostly vintagers and herdsmen — live a tax-free existence!

With a full picture of our objective in mind, we set about getting the necessary permission for portable operation from this exclusive DX point. Numerous inquiries of San Marino officials went unanswered. It was then that we decided to advise M1B of our plans. He was most cordial and reassuring in his response. There was no official licensing there, he informed us. His own activity was tolerated but kept under constant surveillance by authorities because of a constant fear of international complications. An offer of full hospitality in his home ended



DX "expeditioners" IIHR (logging) and IIPL (slapping bug) while operating in San Marino to give DX-chasers a rare prefix. The transmitter final used parallel 807s, and the receiver was an Italian communications type.

searched out the home of M1B, who welcomed us heartily and warmed us with food and refreshment.

It was then that we felt the true precariousness of our position. Despite the fortification of M1B's hospitality, cold chills began to run up and down our spines as we visualized ourselves signing not

* Via della Secchia 4, Bologna, Italy.

** Urbania, Pesaro, Italy.

I1PL/M1 and I1HR/M1 but instead I1PL/-PRISON and I1HR/PRISON!

But we were in rare M1-land now, and with the fellows in the States on the job listening for us, action was needed. After choosing a likely site, we proceeded with the risky task of installing an antenna. We selected an ancient tower and a tree for supports, which meant it would be necessary for the skywire to cross a large walk. M1B cautioned us to go about our job quietly and to avoid drawing the attention of any passers-by. Several times our nervousness caused near short-circuits of a power line. On another occasion, the wire became entangled in the tree branches. Borrowing a walking stick from an innocent-looking bystander who was curiously watching us, we freed it with little difficulty.

Later that night — when the Ws were rolling through in fine style — we learned that the bystander was the Policy Minister of San Marino. Yes, we had visions of prison doors closing in on us!

It was late Saturday afternoon when we fired up our 6V6-parallel 807 rig. Our first CQ was answered by G8IH, followed in turn by several other Gs and TF3EA. Signals were good and we looked forward to a busy night with the gang in the States.

W1LVH opened up for the Ws, being worked at 2250 local time. Hardly had we signed with him than it seemed all hell had broken loose. For a whole night the battle of kilowatts, VFOs and rotary beams raged. Never before has so much r.f. been pumped in one direction on one frequency in the 14-Mc. band. We had difficulty reading calls despite the attempts of many amateurs, including W4CC, to police the frequency.

The Eighth District started with W8BRA, the Ninth with W9VW, and the Seventh with W7DL. At 0352 Sunday the California gang signaled their presence with W6ITA leading off, followed closely by W6DZZ, W6PFD and W6VFR. The signals that the W6s put through the East Coast QRM were amazing! Not to be overlooked, the Midwest was heard from next in the person of W0YXO. KP4KD was lead-off man for a string of KP4s and VE3BBR sneaked through for our sole Canadian contact.

Sunday night was spent resting up and operating 'phone from M1B's shack. One of the lucky Ws to make the grade was our old friend of DXCC fame, W1FH, whom we had previously worked on c.w. from our own portable set-up.

We pulled switches at dawn on Monday, August 23rd, with W6FSJ just getting under the wire for our final QSO. Our contacts numbered almost 150, cards for which have already been mailed to the respective bureaus.

We wish to thank the W gang for their great interest in our trip, and our only regret is that we couldn't work more stations than we did.

Now, if someone would only go to Monaco or Andorra! For our own part, we are now speculating on another adventure. . . . What say to I1PL/HV and I1HR/HV, gang?

OUR COVER

A few years ago a youngster by the name of Jane Bieberman suddenly took an interest in the strange clatter which often came from the den of her home in Bala-Cynwyd, Pa. She investigated. Although she didn't understand then much of her dad's resulting explanation of what amateur radio was, she discovered the sounds were radio code, and she decided she wanted to learn it. With the help of her dad, she did, and soon could copy 5 w.p.m. OM W3KT was very proud of his daughter's accomplishment, but he made no attempt then to push her toward an amateur license because of her tender age — 6 years.

This spring, however, Jane announced that she wanted to become a ham. W3KT, by profession a schoolteacher, made certain she started right: He sent code to her carefully by hand, and later with a war-surplus keyer (W1AW practice schedules were well past Jane's bedtime). He gave her basic instruction in radio fundamentals before turning to the *License Manual* for rehearsal, so there would be no learning parrot-fashion. On August 20th little Jane sat down in the Philadelphia RI's office and took the amateur exam, which she passed with flying colors. "I did have a little trouble with some of the diagrams," Jane says, "but the code was easy and the written part not too hard." And so it was that Jane Bieberman, just turned ten years, became W3OVV and probably the world's youngest licensed amateur radio operator.

Her first QSO was an experience that unnerved her — she trembled so that she had to ask her dad to finish it. But she's had numerous successful and enjoyable contacts since, mostly on 40-meter c.w. Occasionally she works the 50-Mc. 'phone rig at W3KT to talk to members of the Frankford Radio Club. And, of course, she helps W3KT in his duties as W3 QSL manager. But Jane's folks are not too sure about this radio business, now that they think it over. When she should be practicing on the piano, she's often found up in her bedroom tuning up on 7 Mc.!

Jungle Job—100 Watts

A Portable Transmitter for Rugged Country

BY CHARLES C. FULLER, * HC1ES

UPON my return to the States from Ecuador, in 1946, I knew beyond question that any transmitter for jungle operation *had* to be portable. An Indian *cargador* who, in the Quito capital—at almost 10,000 feet up—can load 200 pounds on his back and trot down the street, is completely fagged at low altitude after a day's journey through jungle mud carrying a maximum of 75 pounds.

Therefore, the prime consideration was weight, including transport case, spare tubes, coils, crystals, trouble-shooting meter, etc. Of equal importance were power supply and source. One doesn't recharge batteries in the deep bush. Gasoline is dangerous, difficult, and expensive to carry in quantity. And, since the rig was also to be used in Quito on commercial 115-volt 60-cycle lines, the decision was to utilize for jungle power a modified 115-volt 60-cycle 500-watt generator, and to build the rig for conventional a.c. power. The receiver could then be operated from the same source. The rating of the generator becomes modified somewhat in the bush—it might be called a "2-Indian-power" job!

Past experience had proved that 100 watts of c.w. will get out very well under any average condition. Chief operation was to be on 7 and 14 Mc., with 80 and 10 meters as auxiliary bands. A push-pull output stage is a personal preference over single-ended affairs, because the p.p. stage is symmetrical, balances out even harmonics in good fashion, and is generally easier to handle. Since a clean note cuts through QRM, it seemed that sixty AT-cut rocks would weigh less than a good VFO, while keeping power requirements down to a minimum.

Another point to consider was that one doesn't just run around the corner in the jungle to buy a new bias battery. It takes an Indian runner some six weeks to get in and out of the bush, and then

he is still 100 km. removed from a radio store!

With all these and other considerations in mind, the rig worked out to be a 6V6 Tri-tet crystal oscillator driving an 815 p.p. final, with blocked-grid keying. The negative voltage for the oscillator and amplifier was to be furnished by a 117Z6 in a circuit that had been proved and debugged years ago at my QTH of W9DUP, where it was in use right up to Pearl Harbor Day. One of the new selenium rectifiers¹ might be used to replace the 117Z6, but there was no time to try it.

The 815 was selected for several reasons. It requires very little drive, it is compact, and no neutralizing is necessary with proper handling. While its ICAS rating is 75 watts maximum input, it can be run at 100 when everything is properly tuned. We have had no trouble with the tube running at the higher input.

For the power supply, a transformer rated at 600-0-600 volts at 200 ma. was available. An 83 rectifier seemed logical, and the usual condenser-input filter was used to keep the voltage up. Actually, the power supply gives only 560 volts at 180 ma., which can be accounted for either by a peculiarity in Ecuadoran power or the overenthusiasm of the transformer manufacturer. If the 815 were to be run at rating, a 500-volt 175-ma. supply would be adequate.

With the design fairly well established, a trip to Kansas City located enough AT-cut blanks to make up—with those I'd cut and ground myself—the sixty crystals. Thanks are due and freely given to the engineers at Crystal Products Co. for their fine coöperation in lapping those blanks to 6990 kc., from which point all have been ground and etched to desirable spots in the 7-Mc. band.

By the greatest luck in the world, a scouting trip to Chicago for parts turned up a simple 40-watt rig built into an SW-3 cabinet. The owner was building to higher power. One look at that compact outfit and it was evident that it could

* P.O. Box 2850, Quito, Ecuador.

¹ Berkman, "Using Selenium Rectifiers," Oct., 1947, *QST*, p. 50.

A 100-watt transmitter complete in an SW-3 cabinet does a noteworthy job at HC1ES, if the wallpaper is any indication.



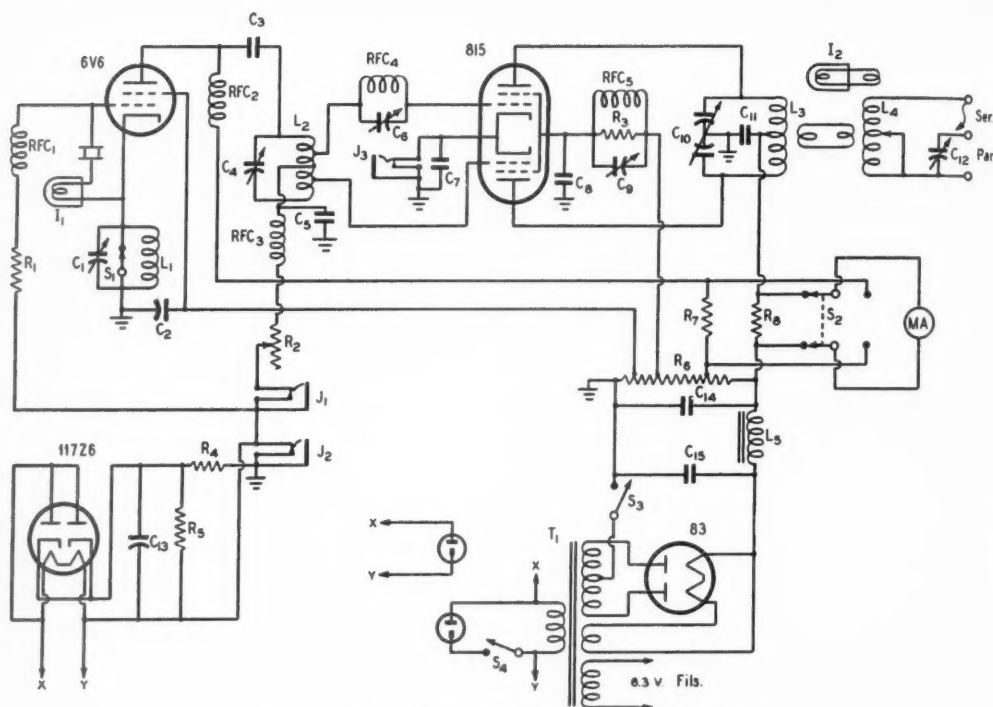


Fig. 1 — Wiring diagram of the two-stage "Jungle Job."

- C₁ — 100- μ fd. midget variable (Hammarlund APC-100).
 C₂ — 0.01- μ fd. 600-volt paper.
 C₃ — 0.047- μ fd. mica.
 C₄ — 50- μ fd. variable (Hammarlund SM-50).
 C₅, C₇ — 0.02- μ fd. 600-volt paper.
 C₆, C₈ — 3-30- μ fd. mica compression trimmer.
 C₉ — 0.01- μ fd. mica.
 C₁₀ — 50- μ fd. per-section variable (Hammarlund MCD-50-S).
 C₁₁ — 0.01- μ fd. 1500-volt paper.
 C₁₂ — 100- μ fd. variable (Hammarlund SM-100).
 C₁₃ — 12- μ fd. 150-volt electrolytic.
 C₁₄ — 2- μ fd. 800-volt oil-filled, flat.
 C₁₅ — 2- μ fd. 1000-volt oil-filled, round.
 R₁ — 20,000 ohms, 1 watt.
 R₂ — 15,000-ohm potentiometer.
 R₃ — 100 ohms, $\frac{1}{2}$ watt.
 R₄ — 0.47 megohm, 2 watts.
 R₅ — 39,000 ohms, 2 watts.
 R₆ — 40,000-ohm 100-watt wirewound, adjustable (Ohmite Dividohm).
 R₇, R₈ — 20 ohms, 1 watt.
 L₁ — 14 turns No. 22 d.c.c., $\frac{7}{8}$ -inch diam., $\frac{1}{2}$ inch long.
 L₂ — 3.5 Mc.: 50 $\frac{1}{2}$ turns No. 18 enam., 2 $\frac{1}{4}$ inches long. Grid taps 18 turns each side of center.
 7 Mc.: 26 turns No. 18 enam., 2 $\frac{1}{2}$ inches long. Grid taps 8 turns each side of center.
 14 Mc.: 12 turns No. 18 enam., 1 inch long. Grid taps 4 $\frac{3}{8}$ turns each side of center.

- 28 Mc.: 5 $\frac{1}{2}$ turns No. 18 enam., $\frac{1}{2}$ inch long. Grid taps 1 $\frac{3}{4}$ turns each side of center.
 All L₂ coils wound on Bud 1 $\frac{1}{2}$ -inch diam. ribbed-bakelite forms.
 L₃ — 3.5 Mc.: 66 turns No. 20 enam., 2 $\frac{1}{2}$ inches long. Output link 3 turns.
 7 Mc.: 33 turns No. 14 enam., 2 $\frac{1}{2}$ inches long. Output link 1 turn.
 14 Mc.: 17 turns No. 14 enam., 1 $\frac{3}{4}$ inches long. Output link 3 turns.
 28 Mc.: 8 turns No. 14 enam., 1 $\frac{7}{8}$ inches long. Output link 1 turn.
 All L₃ coils wound on Johnson 1 $\frac{3}{4}$ -inch ribbed-porcelain forms. Links wound over center of coil, on 8 strips of polystyrene.
 L₄ — 30 turns No. 14 enam., 1 $\frac{1}{4}$ -inch diam., 2 inches long, close-wound, self-supporting on polystyrene strips. Taps at 11 $\frac{1}{2}$ and 19 $\frac{1}{2}$ turns.
 L₅ — 15-henry 200-ma. choke (Stancor C-1721).
 I₁, I₂ — 6.3-volt pilot lamp.
 J₁, J₂, J₃ — Closed-circuit jack.
 MA — 0-200 milliammeter.
 RFC₁, RFC₂, RFC₃ — 2.5-mh. r.f. choke.
 RFC₄, RFC₅ — 12 turns No. 26 enam., close-wound on $\frac{1}{4}$ -inch diam.
 S₁ — See text.
 S₂ — D.p.d.t. switch.
 S₃, S₄ — S.p.s.t. switch.
 T₁ — 600-0-600 v. 200-ma. secondary; also 6.3 volts at 4 amp., 5 volts at 4 amp.

be revamped for 100 watts and converted to my design with a minimum of work. I bought it.

There was only one fly in the ointment. The rig had to be rebuilt, all of the coils wound, everything put into as near-perfect shape as possible, all with no testing until it was plugged

in, months later, almost two miles high in the Andes at Quito!

The reason? My QTH had 25-cycle current. And being pressed for time, there was no chance to test the rig elsewhere.

With *Handbook*, soldering iron and a prayer,



the work began. Shortly the original owner wouldn't have known his baby. And some nine months later when unpacked at Quito — after having suffered a rigorous train-truck-ship-plane journey that smashed a heavy padlock on the case — and hooked to a 40-meter Zepp, the first CQ (as HC1CF) brought an instant reply and report of 479 from W2AYN. The second call raised W1BSS and a 579.

Only one bug developed. This was a v.h.f. parasitic that was cured with two traps. These traps can be left out during any original construction — if parasitics show up, put in the traps and tune them until the little beasties disappear.

The Circuit

Most of the features of the circuit will become apparent after a glance at Fig. 1. It will be noticed that a switch, S_1 , is shown for shorting out the Tri-tet-oscillator cathode coil when straight-through operation is desired. This switch is simply a bent corner on a rotor plate of C_1 . When the condenser is turned full "in," the plates short. Grid current of the 815 is read by plugging in a low-range meter at $J_1 - J_2$ is for the key. The closed-circuit jack, J_3 , is for a relay that can be used to short the input of the receiver, for convenience in break-in operation, or the relay can be used to key a sidetone oscillator for monitoring purposes. The jack is a convenient device since, by plugging in a dummy plug, the cathode circuit is opened and only the crystal oscillator will operate. The resistance of the relay winding adds a little cathode bias to the 815 stage.

The meter switch, S_2 , allows either oscillator or final plate current to be read. S_4 is the line switch for the entire transmitter, and S_3 is the "stand-by" switch for removing all plate and screen voltages.

In the antenna circuit, provision was made for either series or parallel tuning of the antenna coil. The jumper is used across the top two terminals for parallel tuning — it is opened for series tuning. A small lamp is loosely coupled to the antenna coil to indicate resonance, and another lamp in series with the crystal serves as a crystal-current indicator.

The bias supply furnishes about -75 volts. With the key "up," this voltage is applied to the oscillator and amplifier grids. With the key down, oscillator bias is developed across R_1 and amplifier bias across R_2 (and the cathode-circuit relay, if used). Resistor R_4 prevents a heavy drain on the bias supply when the key is down. By adjusting R_2 , proper bias for the 815 can be obtained over a wide range of excitation conditions.

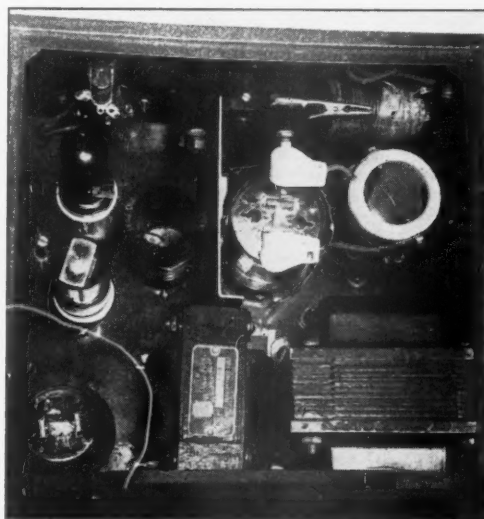
Construction

A complete detailed description of the parts arrangement within the SW-3 cabinet will be omitted, on the basis that one is not likely to try to duplicate the transmitter exactly. However, it

might pay to point out a few of the dodges necessary to sandwich all of the parts into such a small space.

The 815 is mounted close to the tank coil, with the socket rotated to bring the two plate connections of the 815 into proper position. The 815 is surrounded on the coil and meter side by a shield made from a smaller tube shield that was modified with a pair of shears. A sturdy baffle shield is used between the grid coil, L_2 , and the 815. The antenna tuning condenser is mounted on the front panel above the chassis, and the 815 grid- and plate-tuning condensers are mounted below the chassis. The cathode-tuning condenser, C_1 , is mounted under the chassis and is adjusted from above with a screwdriver. The adjustable grid leak, R_2 , is mounted on the chassis and is reached from the top with a screwdriver.

Many of the other parts can be identified in the photographs. The a.c. line plug, the three jacks, and S_4 are mounted on the back of the cabinet, below the chassis level. The meter switch, S_2 , and the stand-by switch, S_3 , are on the front panel.

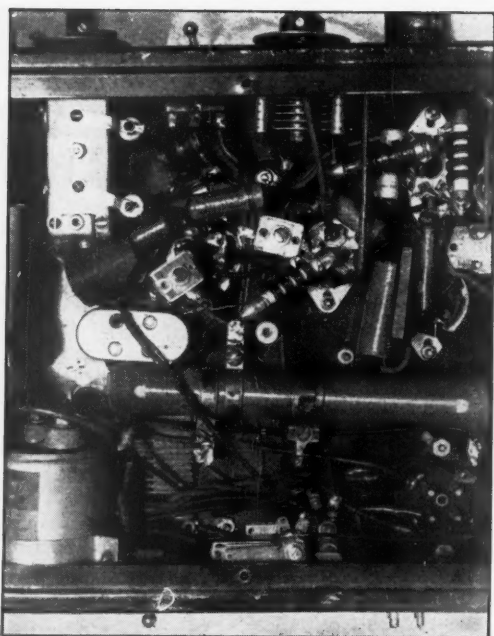


A top view of the 100-watt transmitter shows that there isn't much spare room inside the cabinet. The 815, antenna coil and plate tank coil can be seen alongside the plate transformer. The grid coil, oscillator tube and bias rectifier tube are on the other side of the baffle shield.

A final touch — and one that is very convenient — is the complete wiring diagram drawn in ink on white paper and fastened inside the top cover.

Tuning & Adjustment

The transmitter tuning is conventional, of course, and only a few high spots will be men-



The tuning condensers (except antenna), resistors and fixed condensers are all mounted under the chassis. One round filter condenser can be identified in the lower left-hand corner; the other filter condenser is flat against the side wall, alongside the plate-tank tuning condenser. The oval-shaped gadget visible at one end of the bleeder resistor is a Bradleystat, well-known and identifiable as a variable resistor to old-timers but unknown to newcomers to the game. It is used as an adjustable grid leak in this transmitter.

tioned. When working on 7 Mc., the cathode condenser, C_1 , is shorted out by turning it full "in" and engaging S_1 , mentioned previously. The oscillator alone can be checked by putting a dummy plug at J_3 and opening up the 815 cathode circuit. After checking the oscillator, by observing a plate-current dip with tuning, using a loop and small flashlight bulb coupled to L_2 , or listening to the signal in a receiver, the 815 amplifier is tuned in the normal manner. The tube manufacturers recommend that tetrodes and pentodes never be operated unloaded for any length of time, and that procedure is followed at HC1ES. A 75-watt lamp can be connected across the "series" antenna posts to furnish a dummy load for test purposes. If you must check the 815 with no load, don't sit on the key for more than a few seconds at a time.

A low-range milliammeter plugged into J_1 will read grid current, and this should run around 3 or 4 ma. It is adjusted by the tuning of C_4 , the setting of R_2 and the position of the grid taps on L_2 . R_2 will normally be set around 10,000 or 12,000 ohms, but some variation from this value may result in slightly better efficiency. The operating grid bias should be minus 45 volts or so—you can work back from there.

Depending upon your antenna system, series or parallel tuning of the feedline can be used. A tap on the antenna coil allows some variation in the antenna inductance for best tuning. When operating in the 80-meter band a 150- μ fd. mica condenser is bridged across C_{12} . The oscillator is run straight-through (S_1 closed) and an 80-meter crystal is required. For 14- and 28-Mc. operation, 7-Mc. crystals are used, with S_1 open and a 14- or 28-Mc. coil at L_2 .

Operating voltages at the taps on R_3 are 105, 200 and 300, corresponding to resistances to ground of 19,000, 28,200 and 31,400 ohms. These voltages should be checked when the rig is running fully loaded, with 180 ma. to the 815 plates.

If you have been wondering about heat generation in the transmitter during operation, rest assured that the little rig is always run with the cover open. This is a "must" for anything of this nature if forced ventilation isn't used.

If parasitics are present they will probably be of the v.h.f. type, and will manifest themselves during preliminary tests by double-dip resonances in the final, lack of pronounced dip, fuzziness of the signal as heard in the receiver, or by general erratic behavior in tuning. It is suggested that the trap in the screen lead be tried first. If this does not result in a complete cure, then the grid-lead trap should be added.

Performance

Properly built and adjusted, this rig is a top-flight job. Seventy-five countries were worked in less than three months. WAC can be made practically every night. Grand average of S reports is S6-7. An S9-plus is not infrequent. W1NF consistently reports us S6-7, and VKs, ZLs and many others regularly give us S8-9. They won't believe we're running only 100 watts. Most work has been done on 40 and 20. Eighty is strictly local at present, and 10 is rarely used due to an exceptionally bad line noise which peaks there. In the 14th DX "test," one exchange was made in less than every three minutes of working time, and during one solid two-hour stretch an exchange was completed every 1.6 minutes—which certainly means a good, solid signal.

The antennas in use are carefully-pruned half-wave 7-Mc. Zepps. Recently another "screwball" 14-Mc. center-fed half-wave, formed into a square inside the shack, and fed in parallel with a full-wave on 14 Mc., has been used. Opposed to all hidebound theory, instead of canceling out (one antenna being practically folded back on itself), the two in parallel get sigs into some corners of the world with a pattern we haven't yet been able to dope out!

Special jungle QSLs are being planned for contacts made during "inside" QSOs, but there will be quite a bit of delay before their actual mailing. Have patience, fellows, and we hope eventually to BCNU.



United States Naval Reserve



THE following Naval Reserve amateur calls have been assigned since the last list appearing on this page:

K1NRQ Lawrence, Mass.	K6NAI Mount View, Calif.
K2NRK Huntington, L. I., N. Y.	K6NAJ Port Hueneme, Calif.
K4NAW Raleigh, N. C.	K6NAK Chico, Calif.
K4NRW Chattanooga, Tenn.	K6NRH Hollywood, Calif.
K5NAN Harlingen, Texas	K7NAB Corvallis, Ore.
K5NAO Wichita Falls, Texas	K7NAC Laramie, Wyo.
K5NAP Del Rio, Texas	K7NRX Boulder City, Nev.
K5NAQ Big Spring, Texas	K7NRY Billings, Mont.
K5NRF Groesbeck, Texas	K9NAI Aurora, Ind.
K5NRO Eagle Pass, Texas	K9NRL Neenah, Wis.
K5NRP Kingsville, Texas	K9NRX Michigan City, Ind.
K5NRY Leflore, Texas	K9NRY Terre Haute, Ind.
K6NAG Grass Valley, Calif.	K9NAT Sterling, Kans.
K6NAH Ojai, Calif.	K9NRM Manhattan, Kans.

 Cmdr. D. S. Wicks, USNR, W3JDK, who has been planning officer for the Naval Reserve Electronic Warfare Program since its inception in the spring of 1946, has been ordered to new duty as staff electronics officer for the commander-in-chief, Atlantic Fleet, Admiral W. H. P. Blandy. Cmdr. F. G. Blasdel, USNR, W3ACW, has taken over the EW Program planning as W3JDK's relief.

 Cmdr. G. E. Talbutt, USNR, W5AUL, has reported for duty as head of Reserve communications in the Fifth Naval District headquarters, Norfolk, Va. A member of the prewar Naval Communication Reserve, and on active duty continuously since 1941, Cmdr. Talbutt has been a licensed radio amateur since 1930.

 George Bird, RM2c, USNR, W5HGC, in charge of EW Platoon 8-16, Pawhuska, Okla., once again earned a "well done" for engineering radio, telephone and lighting services for the 1948 International Roundup Cavalcade held in that town in July. Using Naval Reserve equipment and with the aid of several Reservists and amateurs, W5HGC did an effective job which brought favorable publicity to the Navy and the amateur radio fraternity.

◆
 A corner of the station at the Naval Reserve Training Center, San Diego, showing the equipment devoted to amateur radio operation under the call K6NRT. Pictured inspecting the station are, l. to r., W6RCD, W6BVY, W6TYF, W6ZTA, W6LRU and W6DBZ.

As a matter of policy, radio stations and organizations of the Naval Reserve cooperate with amateurs, the Red Cross and municipal officials in providing communications and electric power in emergencies.

In Washington, the National Red Cross generously made space available in its headquarters for Naval Reserve Electronic Warfare drill quarters. This space has been equipped by the Navy with a fine radio station, including an Autotune 1-kw. 'phone/c.w. transmitter as one of the four fixed transmitters installed, plus some portable equipment. Diesel-electric emergency generators make this station self-sufficient in case of commercial power failure. A "10-20" rotary beam some 150 feet above the street level makes DX contacts easy.

The station is under the command of Cmdr. Lewis Sieck, USNR, W4KMG, who is in command of EW Officer Company W-2 in Washington, D. C. The amateur call of the station is K3NRW, and on Navy frequencies the call N0AAB is used.

Lieut. Frank Huston, USNR, who is deputy head of National Red Cross telecommunications, acts as liaison between the Red Cross and the Navy, assisted by Mr. Allen Richter, W3OGQ, who supervises Red Cross radio communications. This Reserve radio station is located in the same building as the National Red Cross teletype facilities, making possible close cooperation and joint operations in the event of disasters throughout the nation. Members of local amateur radio organizations are also cooperating in making this an effective emergency communications center. In addition to W4KMG, a partial list of the amateurs who will operate the station includes: W3s QL, ED, EIS, ECP, JDK, OGQ, OIV, FWX, ACW; W4s IA, KQM; W0CVL.



December 1948

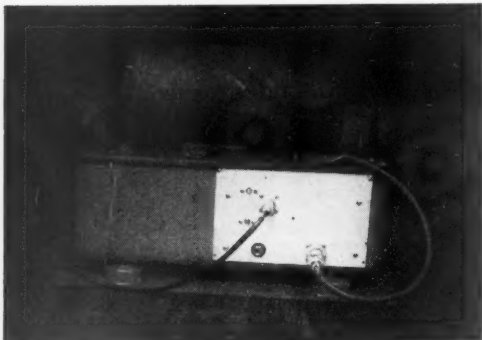
Mobile in Miniature

A 10-Meter Transmitter Built into the PE-103

BY M. JOFFE,* W2BNY

MOBILE OPERATION has come to stay, and most hams who own cars have, at one time or another, had the desire to install a rig in the car. In many cases it has been impossible to find sufficient space for the equipment without sacrificing passenger comfort or baggage room. It is therefore proposed to show that an installation can be made in a very minimum of space while still maintaining a high order of efficiency.

When the writer's new car finally arrived, the



This 10-meter mobile transmitter is housed in the case of a PE-103 dynamotor unit, so the whole rig takes up no more room than the power supply. The coax line to the antenna leaves through the connector above the jack. The cable at the right is for power connections to the transmitter.

first project was to install a 10-meter rig. To start the proceedings, arrangements were made to obtain a PE-103 dynamotor. When it arrived, inspection disclosed that the case had been water-logged and the circuit breakers and relays were corroded and inoperative, although the dynamotor itself was OK. The starting relays were in working order because they were hermetically sealed.

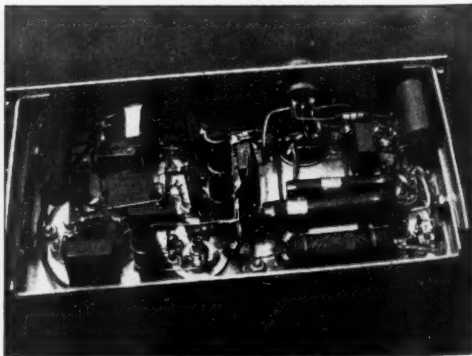
The intended function of the ruined relays and breakers was to prevent damage to the dynamotor should the 6-volt winding be accidentally used with a 12-volt source, and to prevent burn-out should it be overloaded for extended periods. However, with a bit of care and intelligence, protective relays and breakers are unnecessary. Contemplating the situation, we had a happy thought: since they were not usable, why not remove all of them with the exception of the 6-volt starting relay, thus leaving a large empty space in the dynamotor mounting case? Measurements

* 2306 Ocean Ave., Brooklyn 29, N. Y.

• Like to go mobile but worrying about space in the car for the rig? Here's an answer—a transmitter that takes up no more room than the surplus power supply many of the gang are using.

indicated that by using miniature tubes a rig could be built to fit into the space left vacant, so the whole transmitter would take up no more room than the PE-103.

One of the photographs shows the bottom of the mounting plate after removal of the unessentials. To drop the 450-volt output of the dynamotor to 250 volts for the speech and driver stages, two resistors were installed in the space formerly occupied by the 12-volt starting relay. A 16- μ fd. electrolytic is used across the 250-volt tap for further filtering. According to the circuit of the PE-103, the filter consists of only a 2- μ fd. oil paper capacitor, and since this capacitor was also removed, a pair of 16- μ fd. electrolytics in series was fitted into the end bell of the high-voltage side of the dynamotor (see Fig. 2). In order to equalize the voltage each of the electrolytics was shunted by a half-megohm resistor. A surplus Jones barrier strip was used because we were unable to obtain the mate to the power take-off plug on the base of the dynamotor. In addition, a 3-contact microphone jack was installed so that the transmitter could be operated by unplugging the remote-control cord and sub-



Underneath the chassis of the transmitter. Although there is little space to spare, there is no crowding. Slugged coils in the exciter stages save space and are sufficiently broad-band to operate over a reasonable frequency range without retuning.

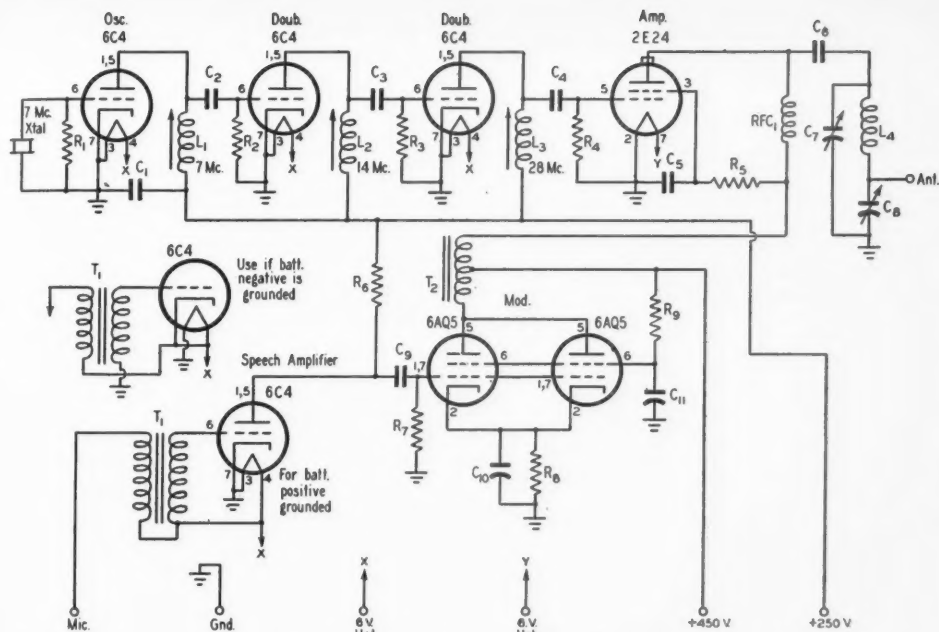


Fig. 1 — The 28-Mc. mobile transmitter circuit.

C₁, C₅, C₆, C₉ — 0.006- μ fd. mica.

C₂, C₃, C₄ — 50- μ fd. mica.

C₇ — 35- μ fd. variable.

C₈ — 140- μ fd. variable.

C₁₀ — 25- μ fd. electrolytic.

C₁₁ — 0.1- μ fd. paper.

R₁ — 75,000 ohms, $\frac{1}{2}$ watt.

R₂, R₃, R₄ — 27,000 ohms, $\frac{1}{2}$ watt.

R₅ — 40,000 ohms, 10 watts.

R₆ — 0.27 megohm, 1 watt.

R₇ — 0.56 megohm, $\frac{1}{2}$ watt.

R₈ — 200 ohms, 20 watts.

R₉ — 25,000 ohms, 10 watts.

L₁ — Slug-tuned, $\frac{1}{2}$ -inch diameter, 62 t. No. 36 enam., close-wound.

L₂ — Slug-tuned, $\frac{1}{2}$ -inch diameter, 15 t. No. 33 enam., close-wound.

L₃ — Slug-tuned, $\frac{1}{2}$ -inch diameter, 9 turns No. 28 enameled, close-wound.

L₄ — 15 turns, $\frac{5}{8}$ -inch diameter, 8 turns per inch (B & W 3006).

RFC₁ — 2.5-mh. r.f. choke (Millen 34102).

T₁ — Carbon-microphone-to-grid transformer (UTC "Ouncer").

T₂ — P.p.-plates-to-voice-coil transformer, v.c. winding unused (UTC R-27).

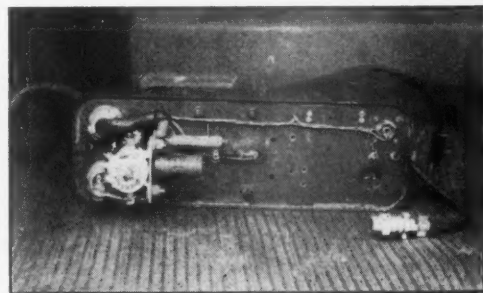
stituting the microphone plug. A 'phone-tip jack was used to supply the heater and control voltage.

The Transmitter Circuit

The transmitter was planned to be as straightforward as possible, no trick circuits with fussy adjustments being considered. This boiled the design down to a triode oscillator followed by two triode doublers in cascade, and a beam-power output stage operating as a straight-through amplifier. Because they are relatively cheap and draw only 150 ma. each for filament current, 6C4 tubes were used in the triode positions. The output tube is an instant heater 2E24. The top view of the transmitter shows the general layout, and the circuit is given in Fig. 1. In line from the front-panel center to the rear of the chassis are the crystal-oscillator tube, the first doubler and the second doubler. The final amplifier, located at the right, was taken out of its socket to show the antenna-matching network capacitors and inductance. Because of the restricted height of

the case, the under part of the chassis had to be limited to a depth of 1 $\frac{1}{2}$ inches. Even so, all the parts are accessible without having to unsolder "layers," as may be seen in the bottom view.

The plate inductances of the oscillator and multiplier stages are slug-tuned, and are broad enough so that no retuning is required when



Bottom view of the PE-103 cover plate after removing unused parts and installing dropping resistors and by-pass condenser.

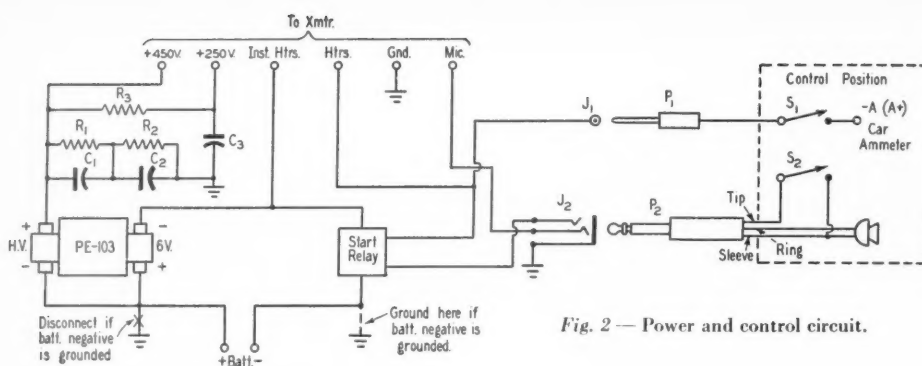


Fig. 2 — Power and control circuit.

C₁, C₂, C₃ — 16- μ fd. electrolytic, 450 volts.
R₁, R₂ — 0.56 megohm, 1 watt.
R₃ — 4500 ohms, 25 watts.
J₁ — Tip jack.

J₂ — 3-way 'phone jack.
P₁ — Test prod.
P₂ — Three-way 'phone plug.
S₁, S₂ — Single-pole single-throw

changing crystals. The forms we used are one-half inch in diameter and an inch long; most surplus dealers have slug-tuned coils that can be modified to suit. Should it be impossible to obtain slug-tuned coils, regular coils may be used and tuned by means of the new ultramidget air capacitors. If relatively small wire is used to wind the coils and the tuning capacitance is kept small, the *Q* will generally be low enough so that the circuits will not require retuning when covering a small frequency range. Using the thin wire specified to wind the coils, the tuning is relatively broad with no apparent loss of over-all efficiency. It is possible to cover from 28.5 to 29 Mc. without the necessity of retuning the exciter stages. Should it be impossible to obtain powdered-iron slugs, brass or copper may be used, keeping in mind that iron increases the inductance as it enters the winding and brass or copper decreases the inductance. The total current drain of the exciter stages, speech amplifier and modulator, with the final amplifier loaded to 70 ma. drain on the high-voltage tap, is of the order of approximately 200 ma. With a 25-watt lamp serving as a dummy load, it is possible to light it up to full brilliancy while whistling into the mike. The final amplifier is parallel-fed and tuned by means of a pi network. It will load into almost any kind of antenna.

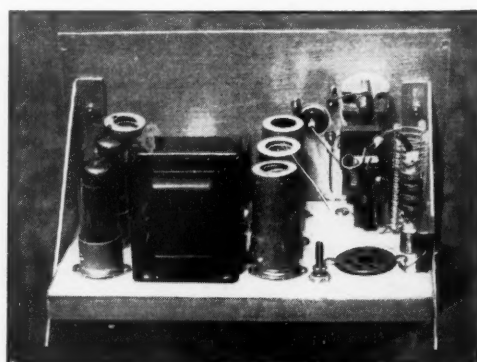
Modulator and Speech Amplifier

The modulator uses a pair of 6AQ5 tubes (shown without shields) and another 6C4 triode is the speech amplifier. To eliminate the need for a relatively large modulation transformer and a push-pull input transformer, the modulator tubes were wired in parallel instead of push-pull. The stage of speech amplification insures sufficient drive for the modulators in case a low-output microphone is used.

Parallel modulators can be coupled to the r.f.

amplifier either through a conventional modulation transformer or by the Heising system. The latter was chosen because a center-tapped choke could be employed as the modulation choke. To save space, the "choke" used is the primary of a push-pull-output-to-voice-coil transformer. It is quite small physically and the primary can carry the plate current. The current through one side is adjusted by varying the antenna loading until it equals the current through the other side. This prevents core saturation and results in a fairly high value of inductance, allowing a greater audio voltage to be built up than would be the case if the center-tap had been left open and the winding used in the normal modulation-choke manner.

It will be noted that the plates of the 6AQ5 modulators are operated at 450 volts. This does



The transmitter uses miniature tubes and small components for compactness. Speech amplifier and modulator at the left, r.f. section at right. The 2E24 final-amplifier tube was removed from its socket (right foreground) for this photograph. The panel measures 7 $\frac{1}{4}$ by 5 inches and the depth behind the panel is 4 inches.

no harm if the bias and screen voltages are set so that the tubes are operated within their plate-dissipation ratings.

To do away with a clumsy high-capacity cathode by-pass capacitor in the speech amplifier, grid bias is obtained from the 6-volt battery. If the positive side of the battery is grounded, wire the grid return to the hot side of the heater circuit as shown in Fig. 2. However, should the negative side be grounded, wire the cathode to the hot side of the heaters and ground the grid return to chassis. In the latter case, the heater is placed 6 volts positive with respect to the grid.

Power Circuits and Antenna

The wiring of the dynamotor and control circuit, Fig. 2, is so arranged that it is not possible to start the dynamotor without first closing the heater switch. If the car battery has its positive side grounded, wire the circuit as is, but if the negative is grounded, use the dotted circuit.

The total drain on the 6-volt battery while transmitting is of the order of 22 or 23 amperes, and in the stand-by position the transmitter draws only 1.5 amperes.

The antenna used by the writer is a three-section whip, each section being 39 inches long. These antennas may be obtained for a very reasonable figure in the surplus market. The sections screw together, which is a most desirable feature, especially when garaging the car; most door frames are too short to accept the additional 9 feet in height. A spring-type mount is bolted to the rear splash apron at a point that has double thickness. The antenna is coupled to the transmitter by means of a quarter-wave section of RG-8/U cable, which measures 5 feet 6½ inches at 29 Mc. The exact length was determined by means of a grid-dip meter and checked with a Q-meter.

Results

In the short time the rig has been in use, dozens of enjoyable contacts have been made with locals and skip stations. No super DX has as yet been worked. In two of the most interesting contacts a mobile station was talked into town, and another talked off a congested highway onto a side road while traveling in New Jersey. On my way home from work, the XYL tunes the home receiver to my frequency and knows exactly when to set the food on the table, so little time is lost in the process of feeding! Besides, it saves her from worrying when heavy traffic makes the going slow.

Strays

Famous last words:
"Gulp . . . don't carry dial-light bulbs and Chiclets in the same coat pocket." — KL7GV

NEW BOOKS

- Fundamentals of Electric Waves**, by Hugh Hildreth Skilling (second edition). Published by John Wiley & Sons, Inc., New York, and Chapman and Hall, Ltd., London, 1948. 240 pages + 5 index pages. 9 × 5½ inches. Price \$4.00.
- Design of Crystal Vibrating Systems**, by William J. Fry, John M. Taylor and Bertha W. Hennis. Published by Dover Publications, Inc., New York, 1948. 182 pages. 9½ × 6 inches. Price \$3.50.
- Elementary Industrial Electronics**, by William R. Wellman. Published by D. Van Nostrand Co., Inc., 250 Fourth Avenue, New York 3, N. Y., 1948. 362 pages + 9 index pages.
- Radio at Ultra-High Frequencies, Volume II**. Published by RCA Review, Radio Corporation of America, RCA Laboratories Division, Princeton, New Jersey, 1948. 438 pages + 48 appendix pages. 9 × 5½ inches. Price \$2.50.
- Frequency Modulation, Volume I**. Published by RCA Review, Radio Corporation of America, RCA Laboratories Division, Princeton, New Jersey, 1948. 505 pages + 9 appendix pages. Price \$2.50.
- Microwave Transmission Design Data**, by Theodore Moreno. Published by the McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York City, 1948. 241 pages + 6 index pages. 9 × 6 inches. Price \$4.00.
- Essentials of Radio**, by Morris Slurzberg and William Osterheld. Published by the McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York City, 1948. 710 pages + 77 appendix pages + 21 index pages. 9 × 6 inches. Price \$5.00.
- FM Transmission and Reception**, by John F. Rider and Seymour D. Uslan. Published by John F. Rider, Publisher, Inc., 404 Fourth Ave., New York 16, N. Y., 1948. 416 pages. Price, cloth binding, \$2.70; paper binding, \$1.80.
- Understanding Television**, by Orrin E. Dunlap, jr. Published by Greenberg, Publisher, 201 East 57th St., New York 22, N. Y., 1948. 110 pages + 14 glossary pages + 3 index pages. Price \$2.50.

Silent Keys

IT is with deep regret that we record the passing of these amateurs:

W1MU, Samuel C. Bonino, Roslindale, Mass.

W2PLI, Richard L. Prosser, Englewood, N. J.

W3SI, Charles G. Meyers, Mechanicsburg, Penna.

W4JRS, Frank T. Henson, Elliston, Va.

W5FWE, Warren J. Briggs, Galveston, Texas

W6OSL, Lawrence H. Wilson, Sacramento, Calif.

W7QL, ex-W7DVY-8BEN, Glen O. Katzenberger, Bremerton, Wash.

W9AP, Lee S. Fetcher, Winnetka, Ill.

W9BLY, John C. Ludwig, Milwaukee, Wis.

W0ESL, Rev. Romuald Fox, Atchison, Kans.

G2KM, Cyril Stainton, Hull

G3AFC, Harry F. West, London

KL7DO, E. Jay Bissell, Yakutat

VE2HL, J. H. Labelle, Quebec



25 Years Ago

this month

... A new kind of "fist" is coming into being — a heavy, firm style that will make each dot carry across separately — the transocean fist. — *February, 1924, QST*

EAST, WEST AND NORTH, ocean barriers were toppled decisively in the closing weeks of 1923 as amateur radio, suddenly grown to international stature, achieved two-way communication across the Atlantic, the Pacific, and the vast expanses of the Far North. The procession of history-making feats of this period is enthusiastically chronicled in the pages of early *QST*'s.

To start, mid-November saw a 200-meter DX record of 4600 miles established when ARRL operator Donald Mix, 1TS, frozen in with the MacMillan Arctic Expedition 700 miles from the North Pole, worked into sunny Hawaii and 6CEU, the station of R. Smith. This accomplishment wasn't to stand for long, however. Within eleven days, on the 26th, Charles York, 7HG, of Tacoma, Wash., successfully contacted JUPU who gave his location as Tokio, Japan, a new record of 4650 miles.

Meanwhile, throughout the breadth of North America, United States and Canadian amateurs went ahead with routine preparations for what was to be the final onslaught on the path to the Continent . . . the Fourth Transatlantics. Spirits were bolstered by the one-way achievements of the previous two years' tests; certainly the winter of 1923-24 would see two-way work accomplished.

Hopes on this side were especially pivoted on the determined activity of Leon Deloy, French 8AB, who earlier in the year had visited the United States to confer with amateurs and League officials, complete arrangements, and procure American equipment, the latter including a Grebe CR-13 receiver and specifications for a

Hartley transmitter using series antenna tuning condensers à la Reinartz. With installation completed, Deloy cabled ARRL Traffic Manager Schnell, 1MO, that he would commence 100-meter transmissions to America on November 25th. French 8AB was heard from the start, both at 1MO, where *QST*'s editor K. B. Warner was acting as second op, and at 1XAM, the station of John L. Reinartz.

Success seemed imminent as schedules were made for a two-way attempt on the night of the 27th. This date will long remain inscribed in the annals of amateur radio history. Promptly at the appointed hour the signals of 8AB broke through, calling America for one hour. And then, in response, both 1MO and 1XAM called, hopefully. Deloy heard both stations, worked both stations. The Atlantic path had fallen.

In the flush of these first contacts, Deloy transmitted a message of greeting to ARRL's Don Mix, aboard the MacMillan Expedition's *Bowdoin*. It was copied solid by 1XAM, who 'phoned it across town to 1HX, operated by Boyd Phelps and S. Kruse of the ARRL staff. 1HX relayed to Major Lawrence Mott, 6XAD, Catalina Island, Calif. Promptly, the message was sent on to Jack Barnsley, Canadian 9BP, at Prince Rupert, B. C., who delivered to Mix at WNP — "Wireless North Pole." Later on the night of the 27th, 1HX, 6XAD and WNP combined forces to make possible a 12,300-mile round trip relay in the astounding time of five minutes and six seconds.

Two-way work with French 8AB continued for many nights thereafter; then, on December 8th, the first Anglo-American two-way work was recorded. 1MO, K. B. Warner operating, and British 2KF, the station of J. A. Partridge, London, were parties to this "first"; on one occasion

(Continued on page 116)

Left: Mix in the radio shack of the *Bowdoin*, WNP; center: Schnell and Deloy discuss Transatlantic plans; right: Reinartz works on his Hartley transmitter, featuring "series antenna condensers."



ARRL Week and Member Contest-Party

ARRL Week, January 16th-23rd, Includes V.H.F. SS and GPR—Citations for Outstanding Work—Call-Pin Awards for Each Section Winner in 7th Annual Party

BY F. E. HANDY,* WIBDI

THE seven-day period starting January 16th has been designated as ARRL Week. A special message¹ from League President Bailey to ARRL members will be sent from WIAW and all OBS appointees daily during this week. The week follows closely the V.H.F. SS of January 15th-16th, to be announced fully in January QST. A feature performance Wednesday and Thursday, January 19th-20th, will be the Governors-President Relay with messages handled all the way by amateur radio from each state capital to the newly-elected President of the United States on the eve of his inauguration. During January there also is a Code Proficiency Run scheduled from WIAW, W6CO and W6OWP (10 P.M. EST, Thursday, January 13th) so that CP credit for the Member Party can be secured in January if not previously applied for. The entire League field organization will climax the observance of ARRL Week on January 22nd and 23rd by taking part in a Member Operating Party, following a simple scoring plan, and with call-pin awards.

ARRL Week is not connected with Party scoring at the week-end but stresses the opportunity for each ARRL member to do *one thing a day* toward some betterment of himself as an amateur or toward the betterment of our ARRL. Our League organization "of, by and for the amateur" is as strong as the sum of knowledge, station performance and individual loyalties. ARRL's status depends not only on our practical operating and experimentation, but on what we make of our organization by personal support of its Emergency Corps, section networks, contact with directors, and through participation in every phase of League activities and plans. This is the week to get started in these things!

Organizational ideas for your ARRL Week observance follow. Can you manage to select or add proper items and accomplish one per day for seven days? Interest one young person in amateur

radio; help him to follow through. Catch up on QSLs. If you work 'phone, try a little c.w.; if c.w., try a little voice work. Join the Emergency Corps, as supporting or full member; provide for emergency equipment (a) in your station, (b) in car, or (c) build a transportable unit, as complete as possible. Report into your section traffic net, c.w. or 'phone. Go after some up-until-now neglected awards or aims in amateur radio. Pay radio club dues; renew or extend ARRL membership. Make three new members of RCC, or earn it yourself, if not a member, by seeking a radio rag-chew with a member. Ask your SCM about an appointment along lines for which you are interested and qualified. Copy the Code Proficiency Run (January 13th) and submit it for ARRL certification. Originate ten messages to old ham friends through your station. Can you do one-per-day?

ARRL Week Citations

There's no scoring for the activities during the Week, but there will be a special letter of recognition from President Bailey for what he deems the most constructive report of projects initiated or implemented in the direction of "better or fuller ARRL organization" during this week! While the week-end operating test (Member Party) is limited to the field organization (see page 6), we have ARRL members all over the world who may well become mutually acquainted by international QSO during ARRL Week. In recognition of this, the ARRL president will certify by special letters to each pair of member-operators their claims confirmed by QSL-to-ARRL covering two-way work, constituting legitimate amateur communication over the greatest distances that can be accomplished between any two points in the world during ARRL Week, on each of the following amateur frequency bands: 3.5-4, 7-7.3, 14-14.4, 28-29.7, 50-54 and 144-148 Mc. What will be the greatest DX to be reported between any two members of ARRL ('phone-'phone, c.w.-c.w., or c.w.-voice but not cross-band work) in any of these six bands, during the week January 16th-23rd? Status as full member in U.S.A.-Canada or associate ARRL membership in other lands is required and the contact will have to be good enough to ascertain status and exchange signal reports.

(Continued on page 118)

* Communications Manager, ARRL.

¹ WIAW will send the message from President Bailey ahead of any other official bulletins on 3555, 7125, 14,100, 28,060 and 52,000 kc., and 146 Mc. (c.w. simultaneously), at 8:00 P.M. and 12:00 midnight EST, starting Sun., Jan. 16th, continuing through Sat., Jan. 22nd; also Sun., Jan. 23rd at 8:00 P.M. Information will be repeated on voice on 3950, 14,280 and 29,000 kc., at 9 and 11:30 P.M. EST. Over 500 OBS appointees throughout the country will also send the same message, as many times as feasible, on different bands and frequencies, throughout the week.

The World Above 50 Mc.

CONDUCTED BY E. P. TILTON,* W1HDQ

V.H.F. SWEEPSTAKES — JANUARY 15th & 16th

Last year's V.H.F. SS Contest, the first of its kind, broke all records for a v.h.f. affair, establishing it as a major ARRL operating activity. But it could have been ten times as big, and that's the goal for the Second Annual V.H.F. Sweepstakes, to be held January 15th and 16th. Plan now to take part — and get everyone you know who has v.h.f. gear to do likewise. Circle that weekend on your 1949 calendar, now! Rules in January *QST*.

WHEREAS this department in the December, 1947, issue of *QST* was packed with reports of 50-Mc. F_2 DX, the end of October this year finds most of us still waiting, hopefully, for the m.u.f. to creep up to 50 Mc. It was getting close, as the month came to an end, but only on a few paths were contacts actually being made. The Mexico-Argentina circuit was going merrily on, as it had been since late August, and a few southern W5s had worked into South America. A Canadian had been reported heard in Ecuador, and the m.u.f. between England and South Africa was brushing 50 Mc. But the m.u.f. across the North Atlantic was hitting a high of only about 47 Mc., and the big question of the moment was whether it would go over 50 in November.

The 50-Mc. band opened almost nightly, with clock-like regularity, according to XE1KE, Mexico City, who had made 276 50-Mc. QSOs with South America, 257 of them with Argentina, up to mid-October. The LUs broke through daily around 4 P.M. CST, with strong and nearly-steady signals. The opening usually lasted until about 5:30, but the signals came back in around 7:30, somewhat weaker, and with a 2-cycle flutter. LU6DO has been hearing signals up to about 52 Mc., and LU9MA has reported hearing XE1KE/mobile. The Argentine stations are also working OA4BG, PY2QK, HC1JW and HC2OT. PY2QK, in running tests with LUs to check m.u.f., has been able to get through on frequencies as high as 60 Mc.

A recent addition to the South American 50-Mc. picture is HC2OT, Guayaquil, Ecuador. Steve is an old hand at v.h.f. work, having done his share as W5DNN. He confirms the report that the opening of the 50-Mc. band is a regular daily occurrence. In his case it is open from 8:45 to

9:15 EST nightly, and often later. He feels that more stations in South America would use 50 Mc. if they realized how consistently the band is open. Both he and XE1KE say that 50-Mc. signals are heard at times when 28 Mc. is apparently dead, though this is more likely the result of lack of activity on 28 Mc. in the right places to have it show up at such times. Steve is running daily skeds with W5VY on 50 Mc., as yet without success. On the evening of October 25th, HC2OT heard W5s BUV and JLY of San Antonio, and LBD, Uvalde, Texas, between 9:55 and 10:15 EST. At 10:40 he worked TG9JW, Guatemala City, remaining in contact until 11:50, at which time the band was still open to TG9 and W5. No contact was possible with the W5s, who were talking among themselves, apparently unaware that the band was open. On Sept. 17th, HC2OT heard the 50-Mc. signal of VE1QZ for a short period, when the latter changed from 28 to 50 Mc. for a test.

There was promise of an opening between South Africa and Europe during the latter part of October. Last year ZS1T and ZS1P of Capetown made the first 50-Mc. contact with PA0UN on October 11th, but this year ZS1P has made the headlines in a different manner. According to a BBC news flash, relayed by G6DH, ZS1P has been receiving BBC television in Capetown, believed to be the first instance of actual television picture reception over this path.

As if to enliven the period of watchful waiting for rising m.u.f., October provided several good aurora openings. Ionospheric disturbances were frequent, and they were usually accompanied by aurora effect, though some of the best conditions developed at hours when there were few 6-meter stations active to take advantage of them. W9QKM, Glenview, Ill., worked W0KPK and

* V.H.F. Editor, *QST*.

W9URQ, of Robbinsdale and St. Paul, Minn., late in the evening of Oct. 1st. W3RUE, Pittsburgh, worked W9AB, W9PK, W8MVG, W2MEU, W3OJU, W2AMJ and W1LLL on the 17th. Several unidentified 'phone signals were heard on 144 Mc., but they were unreadable because of the pronounced aurora flutter. Let's watch for the aurora effect, 2-meter gang — and get on c.w. and find out what we can do! W8NQD, Ashland, Ohio, says that some of the 50-Mc. aurora sigs were readable on voice on the 14th and 17th, but most of his contacts were made on c.w. W2AMJ, Bergenfield, N. J., confirms this partial readability of voice signals during these aurora sessions. Frank worked W3OJU, W8NQD and VE3ANY on the 14th, all on voice. On the 15th he got W8ZSM and VE3AET, and heard several others. The 17th netted VE1QY, W1OKH, Essex Center, Vt., W9PK and W3RUE, and several VE3s and W8s were heard.

Late October provided some excellent 2-meter weather, too. The nights of the 25th and 26th were almost equal to the best that last year had to offer. W3RUE, Pittsburgh, Pa., worked W9s CQH, Lakeville, JMS, Cory, ZJO, South Bend, ASM, Indianapolis, and HKQ, Demont, Ind.; ZHB, Zearing, BHJ, Union, and TKL, Waukegan, Ill.; PZS, Milwaukee, and WWH, Racine, Wis.; W4FBJ, Shepherdsville, Ky.; W8s RLJ, Three Rivers, Mich.; AKW, Cincinnati, and CYE, Miamisburg, Ohio. The Illinois and Wisconsin contacts represent hops of close to 500 miles. W4FBJ's list for the 25th includes W9s JMS, FVJ, TKL, JVC; W8s AKW, CYE, WJC, WXV, UKS and RLJ; and W3s RUE, CTN and PGV, all in the Pittsburgh area. On the 26th W3GV, Erie, Pa., and W4FBJ worked, another hop well beyond 400 miles.

V.H.F. News Around the World

Philadelphia — 144-Mc. signals across the Atlantic? This question is bothering W3EKK, since he received what would appear to be a heard report from PAØJQ on his 144-Mc. signals. No explanation or reception details, other than the time and signal report, are included, but an investigation is being made in the hope of finding whether or not the report is authentic.

The Hague, Netherlands — With a view to establishing standards upon which all could agree, for the furtherance of v.h.f. progress in their own and neighboring European countries, the first Netherlands V.H.F. Conference was held in The Hague last summer. This was an opportune time for such an affair in view of the impending release of the 144- and 420-Mc. bands in several countries on the Continent. The following points were agreed upon:

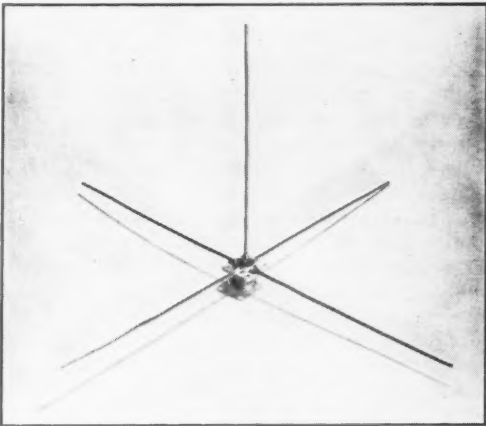
The 5-meter band should be used as much as possible, as long as it remains open to amateur use, since it represents a good field for the newcomer. Crossband work between 5 and 2 meters

should be encouraged, to promote interest in both bands. A fixed channel in the 80-meter band (3625 kc.) should be used for interchange of v.h.f. information.

On the technical side, it was proposed that no modulated-oscillator type transmitters or radiating receivers be used. Horizontal polarization was suggested as an interim standard, with vertical polarization used experimentally, where interest warrants.

V.h.f. operators were urged to use all portions of the bands, rather than piling up at the edges. The use of c.w. for all calling and signing was urged. The signing of calls and locations frequently during test transmissions was recommended. Short QSOs during unusual propagation conditions were suggested, in order that all may have an equal opportunity for DX contacts.

All the above sounds like mighty progressive v.h.f. thinking. Results are already showing, in



A new low in antenna complexity is this 420-Mc. ground-plane suggested by W7KWO. It consists of a Type 83-1R coaxial fitting and five 6½-inch pieces of stiff wire.

the form of some fine work on 144 Mc. in England and on the Continent.

Clacton, Essex, England — The prospect of two-way work on 2 meters across the English Channel and the North Sea to France, Belgium, and The Netherlands, spurred many Gs to action when the 2-meter band was officially opened on September 1st. The first QSOs with PAØ and ON are both believed to have been made by G6DH, the first, with PAØPN, having been made on Sept. 14th. This was the first QSO G6DH had on 145 Mc., his debut on the band having been delayed by the discovery, at the last moment, that his one 829 was more like a mercury-vapor rectifier than an amplifier when the high voltage was applied! The distance on this contact was about 110 miles. The first ON QSO was made with ON4FG on Sept. 26th, 155 miles. ON4FG has a 12-element horizontal array, and is putting a

signal across to G6DH quite consistently on a daily sked which has been running for more than a month. F8ZF is reported to be about ready to fire up, so the first G-F 2-meter QSO will very likely have been made before this appears in print.

The working range on 145 Mc. has been good right from the start in England, the Gs having gotten off on the right foot, with superhet receivers and crystal-controlled transmitters. G5BY has worked seven stations more than 200 miles distant, including G6DH, 240 miles, and G6OS, 287 miles. The receiver used at G5BY is the converter which was used in the first 50-Mc. transatlantic work in 1946, now much revised. It has two 954 r.f. stages, a 954 mixer, and a 955-6C4 oscillator-doubler for injection. Hilton is also set to go on 432.5 Mc. with crystal control. Another crystal job on 420 is ready to go at G6LK. Both use 832 triplers in the manner described by W6OVK in June, 1948, *QST*.

Chatham Center, N. H. — V.h.f. society note: On Oct. 12th Eunice Randall and Kenneth Thompson were married in a little white church, the officiating minister being the Rev. Hollis M. French. But why in *QST*, say you? Well, the principals are perhaps better known as W1MPP, W1PS and W1JLK. The wedding guest list included calls well known in New England v.h.f. circles. The bride, in addition to being a leader in the activities of the Eastern Massachusetts Amateur Radio Association, is famous for having been probably the first woman to be heard over the air. She was a feature performer at WGI, Medford Hillside, Mass., one of the country's first broadcast stations.

Deerfield, N. H. — A job in an f.m. station has its good points, according to W1BWR, who is now operating nightly on 144 Mc. from an f.m. site atop Saddleback Mountain, an elevation of some 1200 feet. He is active from 9 P.M. on nightly.

Knoxville, Tenn. — After hearing about the work of W2TDW/4 from Clingman's Dome (July *QST*), W4FQI, W4FBU and W4ZZ decided to have a try. Though they were unable to reach the summit of the Dome (it's a half-mile climb from the end of the road) they set up at Collins Gap, the highest accessible spot, about two miles east of the Dome. Only one QSO, with W4MEB at Oak Ridge, a distance of 55 miles, was made, but the boys would like to try again. W4ZZ has had extensive hiking experience in the Smokies and Blue Ridge Mountains. He and W4LQE would be glad to go along on any future expeditions which may be in prospect for this area. W4ZZ may be addressed at 405 E. Hill Ave., Knoxville, Tenn.

Toronto, Ontario — Interest in 144 Mc. is at an all-time high in this area, according to VE3AIB, and the volume of reports received in connection with the September V.H.F. Party bears him out.

50 WAS Mc.

Standings as of Oct. 30th

	All-Time 1948		All-Time 1948		All-Time 1948
W9ZHB 48	W5AJG 43	W9DWU 46			
W0ZJB 48	W5ML 42	W9QUV 44			
	W5VY 40	W9PK 43			
W1CLS 44	W5HLD 40	W9ZHL 43			
W3CIR/1 42	W5JLY 39	W9ALU 42	34		
W1LL 40	W5FRD 38	W9QKM 40	28		
W1HDQ 39	25 W5FSC 37	W9JMS 36			
W1CGY 38	W5DXB 35	W9UIA 36	27		
W1HMS 36	W5ZZF 34	W9AB 26	10		
W1JLK 35	W5GNQ 32				
W1NF 35	W5IOP 30	W0USI 47			
W1KHL 34	W5LIU 24	19 W0NFM 46			
W1SLN 33	W5LWG 19	W0QIN 45			
W1CLH 32		W0BJV 45			
W1CJL 30	W6UXN 47	W0CJS 45			
W1AF 27	W6OVK 40	W0KYF 44			
W1EIO 24	W6ANN 38	W0DZM 43			
W1HIL 21	W6IWS 37	26 W0KPK 42	38		
	W6BPT 35	W0TQK 42			
W2BYM 39	29 W6AMD 35	18 W0SV 42			
W2AMJ 38	W6FPV 31	W0INI 42			
W2IDZ 38	W6BWG 18	W0HXY 41			
W2QVH 37		W0YUQ 39			
W2RLV 37	W7BQX 45	31 W0JHS 38			
W2RGV 26	W7ERA 43	W0PKD 36			
	W7DYD 41	W0GSW 29	29		
W3OJU 38	33 W7HEA 40				
W3OR 35	W7FDJ 36	VE1QY 28			
W3RUE 34	W7FFE 35	VE3ANY 27			
W3MKL 33	W7KAD 35	VE1QZ 26	14		
W3MQU 25	W7PA 34	G5BY 24			
	W7QAP 32	XE1KE 23			
W4GJO 46	W7ACD 28	VE4GQ 20	19		
W4EQM 41	W7JPN 19	VE2KH 19			
W4QN 40	W7OWX 15	G6LK 16			
W4GIY 40		XE2C 14			
W4EID 40	26 W8QYD 43	VE2GT 14			
W4DRZ 38	W8NQD 31	30 XE1QE 10			
W4FBH 34	W8RFW 25				
W4GMP 34	W8TDJ 22				
W4WMI 33	W8LBH 21	21			
W4FNR 33	26				
W4HVV 29					
W4MS 26	26				
W4FJ 26					
W4LNG 23					

Note that standings are given for the period March 1, 1946, through the present, and for 1948 only. Medallion awards are offered to the amateur working the most states during 1948 for 50, 144 and 220 Mc. and up. See January *QST*, page 150, for details.

Since February of this year, Les has worked 120 different stations on 144 Mc., 52 of them being VE3s. Several stations in the Toronto area are using flop-over arrays, but practically all contacts are made with horizontal polarization. The Toronto Emergency Net meets each Thursday at 7 P.M. Net frequency is 146.8 Mc.

(Continued on page 120)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

Do you have trouble locating the 20-meter c.w. band lately? Maybe your receiver is more reliably calibrated than ours but we've been hearing almost as many steady carriers below 14,200 kc. as we do above.

It's this testing business.

Superfluous transmissions are bad enough on any amateur frequency but the activity can be particularly devastating on the DX bands. True, certain antenna and rig adjustments call for necessary on-the-air tuning and a small scattering of such occasional QRM must be anticipated. But a good deal of this "VVV ABC NST; Hello, one-two-three-four" hash going on is evidently attributable to plain carelessness plus lack of consideration for others.

Who, possessing all his marbles, would consider it proper to adjust his bug by diddling with it for several seconds (or minutes) while putting a few hundred watts or so into the antenna during the process? There do appear to be such characters. A goodly chunk of this absolutely unnecessary interference stems from people hunting parasites, messing with keying characteristics, gazing at the hue of final tube plates, etc., all of which operations could and should be done while employing a dummy antenna.

Chronic testers also include those who habitually attempt to squeeze a last mil or two load on the final before calling on a slightly-changed frequency, unmindful of the proven fact that one has to cut an input almost in half before a difference in strength is noticeable. And, believe it or not, there are still amateurs who have no provision for cutting off the final when QSYing their VFO!

It should be borne in mind by all of us that rarely can we press our keys, antenna loading, without causing grief for some one.

If all the lead pencils used to pull meaningless sparks off feeders were laid end-to-end, it would be difficult to walk across the street. So, Jeeves, you'll just have to find another way to intrigue our visitors. Now, the mail. . . .

What:

To open the *eighty* festivities out west, W6CIS reports working ZS2G. This contact completes Ken's postwar 3.5-Mc. WAC and he's wondering if any other sixes have made the grade. . . . W2AIS, who has worked his share of 80 DX, has gone to ZC6 to see what it's like

*DX Editor, QST. Please mail reports of DX activity to W9BRD's home QTH: 1517 Fargo Ave., Chicago 26, Ill.

to be the juice for a change. W2ESO says that Pat will concentrate on this band, call not yet known. . . . The Europeans are running rampant on 80 at this writing.

Forty is again as good as it was last season, with lots of prefixes jamming the low end. W1VG picked off XF1A (7050), near Palestine, in an airborne deal. . . . W9KFO burned up the band for PY2AFF (7045), FA9IO (7020), CN8MZ (7040), LA7Y (7005), ON4QF (7050), GW5TW (7045), I1UE (7040), F8ZW (7050), many Gs, KL7s and ZLs. . . . The 6L6 at W5ONL surrounded KL7HI (7080), CM2GV (7015) and VK3QH (7025). . . . An 829B coughed up KH6SZ (7150) and KL7HI (7060) for W3CJS.

We see by the mail that a few fellows are still trying *twenty*. W3NCF asked VR2BD (14,070), HP1BR (14,035), UB5KBA (14,050), CX4CZ (14,075), CX6AD (14,100), VP9CC (14,095), EA7CP (14,090), HK1GE (14,050), OH2NB (14,125), VP2GJ (14,010) and PJ0X (14,050) for QSLs. . . . The situation at G6RH resembles M1B (14,280f), HL1AB (14,215f), VR2AP (14,120), KX6AF (14,080), ZK2AA (14,128), CZ2AC (14,120), UB5KAG and a host of others. . . . Rambling with his new rhombic, W8KPL climbed onto MD2BU (14,100), ZX1AS (14,035), KM6AJ (14,035), ZB1AV (14,090), VQ2GW (14,050), MI3AB (14,005) and then went down to 28 Mc. . . . W9ELA set the



alarm clock and rose early for **AP4A** (14,120), **XZ2JB** (14,092), **C7LT** (14,081), **UA0PA** (14,023), **UA9HA** (14,059), **UL7BS** (14,030), **VS1CR** (14,021), **VS6AE** (14,040), **J9ANZ** (14,062), **J7ABN** (14,114), **CR9AN** (14,110) and **HL1BA** (14,043). Betwixt a few hurricanes, **W4IYT** dallied with **TF3EA** (14,041), **EP1J** (14,045-100), **HL1AE** (14,125), **W2WMV/C9** (14,028), **OESFS** (14,050), **W4DGW/KJ6** (14,265f) and **IS1AHK** (14,070). **W0UOX**'s gallon drizzled upon items like **VU2GB** (14,110), **VK9WL** (14,040), **W6ZNT/KW6** (14,030), **ZD9AA** (14,060 t6) and **HP1LP** (14,060). An 8JK beam captured **HP1LL** (14,315f), **HB1ED** (14,297f), **HH3DL** (14,198f), **VP3TW** (14,395f), **VP3MCB** (14,160f), **VP9S**, **UG6AB** (14,075), **UA6IA** (14,077), et al, for **W4GDQ**. Another microphone manipulator, **W2MPA**, bespeaks of **HL1BK** (14,170), **HL1AA** (14,155), **ZE1JX** (14,170), **C1CH** (14,320), **C3EA** (14,310) on Formosa, **C7AC** (14,150), **KA1AF** (14,150) and **J7ACS** (14,160), all by voice. **W0PVS** missed supper for **UD6BM** (14,048), **YR5I** (14,006), **GC2FZC** (14,112), **KM6AE** (14,114), **W0MCF/C1** (14,090) and **CP1AQ** (14,010). Unable to get a rise out of **TT1KY** (14,048 t7), **W4BPD** cried on the collective shoulders of **EP2B** (14,045 t7), **VP8AM** (14,089), **YU7AX** (14,010 t8), **HC7KD** (14,080 t7), **UJ8AF** (14,014 t8), **AP2F** (14,050), **AP4A** (14,115), **ST2JB** (14,030 t7), **MP4BAB** (14,110 t7), **SU1KK** (14,005), **VU4AC** (14,045), **KAIUSA** (14,080), **VS6BD** (14,025), **HDPP** (14,133 t8) and a rare Australian, **VK8GW** (14,080). That could be **VK9GW** if Gus's finger slipped on the mill. Notes unspecified indicate T9 or T9x quality. Kittenish **W9IU** commences his letter "Dear Herb . . ." [Now, I wonder whom he could mean? — *Jeeves*]. Anyway, Les deserves a hand for snagging birds like **W3MPM/C7**, **VS6BC**, **ZC6XY**, **UN1AB**, **UC2LA**, **J6LPP**, **CR7IZ**, **HI6EC** and **FK8AB**. **W0JNC** mentions **J9ACS** (14,090), **VS1CV** (14,110 t7) and **KA6FA** (14,070), while **W4BYF** concentrated on **HZ1AW** (14,059), **ZP3AW** (14,005), **KM6AJ** (14,030) and some aforementioned Asians. Patiently awaiting his **DXCC** sheepskin, **W4IUO** twiddled his thumbs like this: c.w.: **CT3AA** (14,215), **HA4EH** (14,012), **HA6Q** (14,070), **GC3EBU** (14,017), **VP8AI** (14,075), **VP5AK** (14,070), **PZ1WX** (14,205) and **UQ2AE** (14,008);



View the neat affair employed by Evans Dawson, **VU2FS**. A pioneer in Indian amateur radio since first licensed in 1923 as 2BV, **VU2FS** is currently to be found on 7, 14 and 28 Mc., A3. Power input ranges up to 50 watts with a pair of 807s in the final. [Photo courtesy E. Sirota]

'phone: **C3EA** (14,285), **HL1BG** (14,165), **HZ1AB** (14,370), **IIAXE** (14,290) in Trieste, **KP6AA** (14,255), **VP4TX** (14,314), **VP9DD** (14,317), **W6RET/KG6** (14,255) and **ZC6UN** (14,378). Jim hankered after **VR2AP** (14,340f) and **VR3A** (14,370f) but no dice.

Ten is back on its feet again, should anyone need to be told. **W6HG** now has 66 countries with 48 watts by addition of **IIGKF**, **OK1VA**, **MB9AD**, **CE3CU** and **VS6AM** via A3. Nifties at **G6RH** included **FF8FP** (28,280f), **W6YOT/C6** (28,505f), **AP2F** (28,515f), **VS6AE** (28,370f), **W7ILE/KX6** (28,500f) and **CR9AG** (28,300f). **VP8AD** (28,040) popped up for **W0UOX**, and **W8KPL** telegraphed with **FO8AA**, **FESAB**, **W2WMV/C9**, **SP8XK** (!), plus **ZD4AB**. Log samples from **W0ZUP** feature **VQ4CUR**, **VQ2DH**, **OQ5BQ**, **VP2GJ**, **VP3TR**, **CT1QY**, **IS1AEX**, **HC1KU**, **J2AZA** and **D4AQV**. **W4INO** comes up with

Belfast's **GI6TK**, operated by Frank Robb, has long been a standout on any band when Europe is coming through. Equipment shown here is capable of operation on all bands, 3.5 through 60 Mc. An 808 final is generally used; receivers include an **HRO**, **AR88** and **CR100**.



QST for

CT1PJ, CT1AS, VP3DCA, ST2MP, ZB1S, FA8BG, CE3HN, ZS3G, ZD4AH, MD3MB, CN8EQ, VQ4ASC and VQ2DH, all via the voice route.

Where:

Box 1312, Barcelona, Spain, has been getting lots of business of late. We suggest you try the address for your doubtful EAs. Here we go with some new ones:

CM7MC	Manuel Cuesta, Central Jaronu, Camaguey, Cuba
D4AON	Lt. K. N. Harding, AO 704838, W9QKS/D4, 7350th Air Base Gp., APO 742-A, % PM, New York City
EA3a	DY, MA and TA all to Box 1312, Barcelona, Spain
HA8Z	Lt. P. Sonssich, Budapest XII, Nemetvoegyut 12, Hungary
HPILP	(via W6ADP)
ISIAFM	Rudy Sermasi, Aeropi, Elmas, Sardinia, Italy
Ex-J9AAI	Capt. Van L. Corzine, W8RRG, 28th Maint. Sqdn., 28th Maint. & Sup. Gp., Rapid City AFB, Weaver, South Dakota
J9ACN	Box 239-1, % PM, San Francisco, Calif.
KJ6AB	Box 105, % PM, San Francisco, Calif.
OETFR	(via RSGB)
OH2OP	Box 306, Helsinki, Finland
PJ5KO	(via ARRL)
PJ5PEE	(via ARRL)
PY7DN	Alberto Moreira, Rua Quarante 644, Recife, Pernambuco, Brazil
PY8GL	P. O. Box 351, Manaus Amazonas, Brazil
ST2GH	% International Aeradio Ltd., Juba, Sudan
SUIKK	(via Egyptian bureau)
VE8OH	RCAF, Sawmill Bay, N.W.T., Canada
VP2GJ	(via W1FTX or ARRL)
VP8AK	J. W. Knox, Deception Islands, % PM, Port Stanley, Falkland Islands
VQ4CUR	P.O. Box 110, MacKinnon Road, Kenya
VQ4IMS	Ivan Morris, % East African Airways, Box 1010, Nairobi, Kenya
W6DLX/KW6	(to home QTH)
W6TWW/KL7	Box 944, % PM, Seattle, Wash.
W6ZNT/KW6	% CAA, Wake Island
W6MCF/C1	Capt. H. J. Olson, 01647214, Box 10, Navy 3930, % FPO, San Francisco, Calif.
ZC6UN	% K2UN, United Nations, Lake Success, N. Y.
ZE2JN	3388 Queens Park, Bulawayo, Southern Rhodesia
ZL1MP	David Mitchell, % Bank of New Zealand, Auckland, New Zealand

For the above summary we appreciate the efforts of W1s LLL, MRP, QMI, VG; W2s CJX, HAZ, MPA, UTH; W3s AFW, ITW, OFI; W4UO; W6CYI; W8s IIS, WEN; W9UX; W0UOX.

Tidbits:

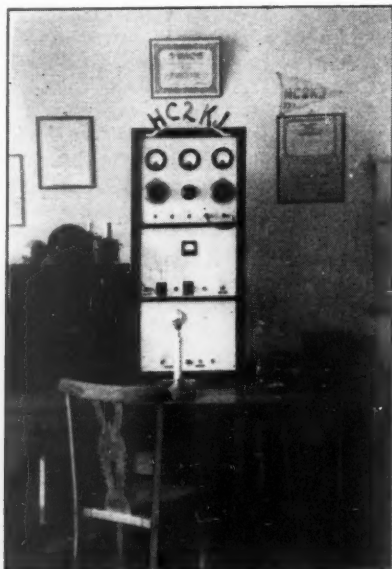
The Far East Amateur Radio League's *PEARL News* provides us with some very interesting reading. The boys are very well organized with a district communications manager for each J call area. Top DX totals there include J2AHI with 140 worked, J2CDJ 94, J3GNX 81, J2HYS 80. . . . Anyone curious as to what became of GW6AA/G2II can find him hiding

behind the gear at ZL1MP. Dave is gunning for old friends on 14- and 28-Mc. c.w. . . . Add legit Curacao stations: PJ5PEE and PJ5KO. The latter is currently quite active with 100 watts on 20. . . . Perusing a postal from Palestine, we hear from ZC6AA that only ZC6s AO, LA, LB and XY remain on the air at this writing. He is hopeful that full activity will recommence in the near future. . . . HL1BA changed hands on the 20th of June and T/Sgt Frank Soltis, present operator, suggests those seeking QSLs for contacts prior to this date try the first licensee. Frank reports the loss of the log of J2AAY, so no further QSLs can be acknowledged for his J2 operation. . . . KZ5AX believes he's all caught up on cards; dissenters are requested to reapply for those gone astray. . . . The XF1A mentioned last month arrived in the States in his C46 recently. He's an ex-W9 and contacted about 100 Ws while winging between Athens and Haifa. Nope, we didn't find out what made him pick that call! . . . VP9E and VP9K have gone back home, the former awaiting his G call and the latter already signing G3CRY. This from W1PRR. . . . GW3ZV, via W1QMI, announces that ZD9AA cards should begin arriving in quantity after the first of the year. . . . The new HZ1AB writes to state that hereafter all QSLs will be religiously acknowledged; previous operation under the call by other parties cannot be QSLd because of incomplete log records. Present operation features '14-Mc. 'phone with Lt.-Col. Crimmins, who has held various DX calls, at the mike. . . . AR1WW flew back home in the presence of W2VLG. He has all logs and records with him so fellows needing pasteboards will be quickly accommodated. . . . After chasing the squinch owls off his beam, W4CYY found out from W6NZZ/KW6 that W6UNE/KW6 is



A sunny day in South Australia was featured by the above round-up of VK5s. We have in the rear, l. to r.: Joe Macalister of W1A, VK5VM, VK5UX, VK5RJ. Front: VK5CD, VK5AP.

unknown on Wake. "JB" hopes that FM8AD will make a New Year's resolution and purchase some QSLs. Amen. VK3AWN is trying two 3-element beams in phase, end-to-end, and is amazing himself on 14-Mc. A3 — ten quick new countries in a few days. W6OMC, W1FH and others hasten to give us the latest VP8 scoop. Seems the bands are getting downright congested in that area. VP8s AM and AO inhabit Antarctica, VP8AL is in the Falklands, VP8AK on South Shetland Isles and VP8AP operates from the South Orkney group. VP8AM will QSP cards to VP8s AO and AP.



HC2KJ, operated by Ernesto Feist of Guayaquil, is one of the more active Ecuador stations on 14 Mc. The neatly-constructed transmitter ends with an 812 final at 100 watts input. A new two-element rotary beam has been giving an excellent account of itself.

Tapping the W6 grapevine, we hear that G6ZO and LU6AJ are each now engaged (no, Jeeves, not to each other), somewhat curbing their DX activities. ZS6OL wants cards only via RSGB and RV2 is moving to Tahiti with 900 new cards on hand. The latter will clean up the QSL backlog 100 per cent in due time. EA8EDZ was honeymooning in Spain but should be back in Rio de Oro by now. XE1AC is trying to get some EA6 boys to QSY from 40 to 20 'phone but perhaps they don't go for Yankee slang. ZD7AA is generally regarded as unsavory but cards from VR4AA are now leaking through. KB6AD left Canton for the U. S. and ZC1CL is toying with the idea of taking a little rig along on a DX field day to Kuwait; if he does, the line forms on the right! G8FA can't figure out why he receives SWL cards on c.w. from all over the world except the U. S. Perhaps the boys

here get their tickets too fast in order to make signals themselves. The Post Office tips us off to the fact that Jerusalem is not considered a part of the State of Israel and mail for that city should be addressed "Jerusalem, *via* Israel". W5JSL, who has been pounding the brass at KX6AF, reports that W4FVI has taken over the job for him. To clear previous conflicting info, the KX6AF QTH is: % 169th AACs Sqdn., Navy 824, FPO, San Francisco, Calif. W5JSL/KH6 is now operating from the Hickam Field area. W6VKY, who had a hand in W3LYK/KC4 at Stonington Island, expects to be looking for pals on 28-Mc. 'phone in the near future. W4FVI, now plugging at KX6AF, says that KX6AB is scheduled to open up from Majuro Island shortly. An enlightening note from Navy Lt. Norm Mennecke, now operating TR1P, notifies us that he's responsible for TR1P contacts only as of August 1, 1948. Two rigs, of 400 and 200 watts, are employed with an HQ-120X inhaler. Various directional antennae are planned. KL7AD is back in the States, expecting to be on as KL7AD/W4 directly. Fil tried a bit of KL7AD/W6 activity while on medical leave from his CAA job in California. We regret to hear of the untimely passing of PK6XA, one of the more active hams in the N.E.I. area and quite well-known to the 14-Mc. morning gang. If G3FNJ's fist sounds familiar, here's why: He's none other than ex-SV1RX who has passed out new countries to a multitude. HL1AY takes time out from hamming to engage in some softball. A star on the Korea outfit, Bob whacked a timely homer in a vital contest with a team representing the J9 garrison. Major Guy Blencoe, HL1AA, who sends us this info, gets much more sleep per night now that he's cleared up the J8AAA QSL situation. VP2GJ, who has been floating around the various bands in nomad fashion lately, turns out to be one J. Paddon, VE3QV, formerly of the ARRL technical staff. Jack pulled a VP7NG, taking to Grenada with him several pet theories as regards the proper ways to deal with the DX-*versus*-W/VE QRM problems. We hope to have a yarn on the trip and it should be interesting.

Jeeves, plagued by TVI like the rest of us, thought he had found the solution for the c.w. man. Observing that his dashes were doing about 90 per cent of the damage, he revised the code alphabet to consist of nothing but dots, the shorter the better. After practising this pseudo-Morse goulash with diligence for a month, he suddenly realized that his pride and joy, a new de luxe electronic key, might just as well be relegated to the ash can if his system should be universally recognized. Now the poor guy is so burned up he can't handle either code!



Correspondence From Members-

The Publishers of *QST* assume no responsibility for statements made herein by correspondents.

TELETYPE PIONEERS

Lone Rock, Wis.

Editor, *QST*:

In the October issue of *QST* I read "The Story of Amateur Radio Teletype." I would like to contribute more to that history.

Before the war Joseph A. Yeazel, W9JK, and I became interested in radio teletype and decided to do a little experimenting on our own. Both of us were working for CAA at the time and also both had had previous experience with teletype. We were both located at Rockford, Illinois. After much time spent in searching for radio-teletype signals we found a few and then started trying to get our own equipment assembled. We finally picked up a lead which resulted in our securing two Type 12 machines.

After copying from commercial stations as far away as Hawaii we got the urge to transmit our own signals. FCC told us it would be permissible on the amateur frequencies. We then did some transmitting between our stations but this was all too-short-haul stuff and we couldn't find anyone else with equipment farther away. Then transfers and the war put a stop to that.

Since our machines did not have synchronous motors we were able to synchronize with most any reasonable transmitting speed by adjusting the motor governors, which was a great advantage at that time. Also, we went through interesting and sometimes discouraging work in bringing the distant signals up out of the noise and also in getting rid of the motor noises and key clicks and then correcting the marking or spacing bias we had introduced in eliminating the noises.

— G. W. Trumbel, W9MFU

SORRY!

New Haven, Conn.

Editor, *QST*:

Not very important, I guess, but on page 96 of Oct. *QST* you say (in "Happenings of the Month") "in its endeavor to get foreign amateur stations moved out of the amateur bands." Shouldn't it have been foreign commercial stations?

— L. W. MacLellan, W1OKX

11 Cheyne Walk, Hendon Central.
London, N.W. 4, England

Editor, *QST*:

... October *QST*, page 96:
Tut! Tut!

— A. W. W. Timme, G3CWW

[Editor's Note: We, of course, should have said "foreign non-amateur stations."]

MARITIME MOBILE

Box 653, Coco Solo, Canal Zone

Editor, *QST*:

Several recent violations of Canal Zone amateur radio regulations by maritime-mobile "W" stations have been noted. The three-mile limit of Canal Zone waters is to be observed and no amateur communications are to be conducted without first contacting the Signal Office, Quarry Heights, for permission to operate in C. Z. waters.

— H. D. Vorhauer, KZ5AX

MORE ON SINGLE SIDEBAND, ETC.

1334 Cannon St., E., Hamilton, Ont., Canada

Editor, *QST*:

After reading the letter by W5OLJ, I find myself compelled to write in defense of *QST*. How anyone can gripe because you fellows are keeping us up-to-date I'll never know. I personally have had no experience as yet with single sideband but anything that may relieve the overcrowded conditions of our bands today and make for QRM-free QSOs, I'm all for it. Does W5OLJ want *QST* to read like the column "Twenty-Five Years Ago"? After all, it's intended that the amateur should keep abreast of science and should at least be prepared to accept any advance that will make for better rigs. Maybe we all won't be using single sideband for a while, maybe for years, but it sure looks like the answer to the congestion existing in the bands today.

I'd like to take time out to thank all the fellows who are "banging their heads against the wall" working out this business of single sideband and getting on the air.

Incidentally, for the fellows just starting up and wanting simple circuits, what's wrong with back issues of *QST*? If they are thinking of getting a ham license they undoubtedly know at least one ham who has a shelf full of *QST*s that they could browse through to their heart's content.

— J. W. Flintoff, VE5BFF

1411 Summit Ave., St. Paul 5, Minn.

Editor, *QST*:

In my 25 years of ARRL membership I do not recall ever being so disturbed as I am over the letters of Messrs. Warner and Shupack in October *QST*. These men overlook (it seems almost purposely) a number of facts relating to the League and to our hobby.

In the early days we all had to feel our way along, with poor equipment, few facts to go on and very few men interested in it at all. Now we have a well-developed engineering basis for our equipment and operating, and the necessity for adequate training and policing of our activities so that all may share equally. Remember, we didn't need drivers' licenses in the early days, but would any of us care to take a chance on today's highways without suitable regulations?

Although the current average age of hams is around 35, the newcomers are still mostly youngsters as we were when we took up the hobby years ago; only now there are over 80,000 of us, many of whom have been at it for 15, 20 or even 30 years. Is it reasonable to expect a newcomer to assimilate enough know-how in one or two months to enable him to build and handle a kw. 'phone with the same assurance as a man who has had considerably more experience? In the same tenor, *QST* has grown up. Would you hold it down to the level of the newcomer when there are many thousands of older men who look to it for new ideas and techniques? The *Handbook* and the League booklets give the solid facts of how to get on the air, and actually all this information appears in *QST* from time to time when there is need to modernize the simpler circuits. How, then, can one reasonably object to the appearance of a new method of transmitting, such as single sideband? Of course it seems complicated to most of us at first. So did a lot of other innovations which are now everyday practice. But we know that, with the concentrated thought of a mass of 80,000 interested beings, someone is surely coming up with a way to simplify it.

What do we want from our hobby, anyway? We still share

(Continued on page 126)



Hints and Kinks

For the Experimenter



BREADBOARD-CONSTRUCTION HINT

How to mount a toggle switch on a breadboard-construction job has been a problem that is hard to lick. They just aren't built to be mounted on a board. It can be done, however, by opening the "eye" of a $\frac{1}{2}$ -inch screw eye with a screwdriver blade, putting the barrel of the switch inside the eye, and then clamping it there with gas pliers. The lock nut on the switch barrel can then be used to hold the switch firm, and the whole assembly can then be fastened to the breadboard by screwing the eye into the wood. — William J. Wright, W5KYK

A "SELF-POWERED" BIAS SUPPLY

Shown in Fig. 1 is a novel circuit that has been used successfully for quite some time. It eliminates the need for a fixed bias supply, yet provides fixed bias!

The VR tube is initially lighted by the grid driving voltage, and a charge is thus placed on the condenser. When excitation is removed, as when the key is up, the VR tube goes out, and the charge that remains in the condenser keeps the amplifier tube cut off.

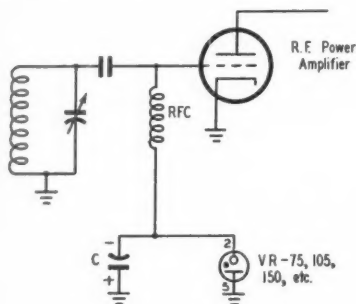


Fig. 1 — A "self-powered" fixed-bias circuit that requires neither batteries nor power supplies. The charge on a large condenser is used as a holding bias to do the job. C is a 20- μ fd. electrolytic condenser of suitable voltage rating.

The leakage resistance of most electrolytic condensers is high enough so that the charge will not leak off for a matter of a couple of hours, so that the next time the rig is used, drive should be applied (to charge the condenser) before power is applied to the final amplifier. This is the normal procedure in tuning a transmitter anyway, so using this system should cause no inconvenience. — Herb Shear, W6WVQ

WIRE-SAVING KINK FOR "SELSYN" USERS

It is often difficult to obtain a five-wire cable to connect synchro motors. This problem is simplified somewhat, however, by the fact that separate windings are used in the motors, thus permitting one wire to be used as a common lead serving both the line circuit and one of the delta circuits, as shown in Fig. 2.

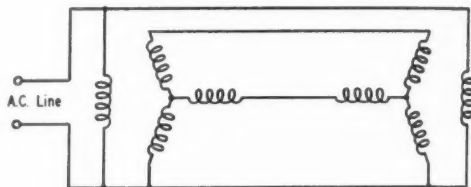


Fig. 2 — Method of using four wires instead of five to connect "Selsyn" indicators. One wire is used as a common lead in two circuits.

For indoor and temporary installations, two lengths of ordinary lamp cord may be used. If you want to reverse the direction in which one motor shaft turns, merely reverse the connections of any two of the three delta wires. — Roy A. Long, W6YBL

ANOTHER "GLYPTAL" SOLVENT

As an old experienced "taker-aparter" of surplus gear, I was interested in the recent suggestion of the use of an insect repellent as a means of loosening screws and nuts that had been made fast with "Glyptal."

Why wait as long as 12 hours for the stuff to work? After breaking a few screw heads and cussing in general about the solid way they put things together, I brushed ordinary paint remover over the "Glyptal" and let it stand for about 15 minutes. Apply the stuff with a small brush, and be careful not to get any of it on your skin. It works wonders, and will speed up the job of tearing surplus apart by many hours. —Cliff Erickson, W8DAE

HARMONIC REDUCTION WITH STUBS

HAMS who are having trouble with harmonic radiation sometimes can make a substantial reduction in the amplitude of even-harmonic radiation by connecting the open end of a shorted quarter-wave stub to the antenna feeders or transmission line.

The function of such a stub is to present a short-circuit to all even-multiple harmonics of the transmitted frequency, while presenting a high impedance to the fundamental. Thus the stub causes no detuning or power loss, but eliminates the even-multiple harmonics.

The stub may be connected at any point along tuned or untuned transmission lines of either the parallel-wire or the coaxial type. A "T"-connector will be necessary for tapping into coaxial lines.

If the transmission line is being used for more than one frequency band, the stub line may be made long enough for the lowest-frequency band used, and a shorting bar may be used to set the stub length to the proper position for each band. Continuous protection from lightning and static charges may be obtained by grounding the shorted end of the stub, and it will not be necessary to remove this ground during operation.—*Roger T. Wilson, W3JHW*

SOLDERING IN CRAMPED QUARTERS

RECENTLY having a soldered connection come loose deep inside a milliammeter, and not wishing to take time or risk further damage to the instrument by taking it apart, I resorted to the stunt illustrated in Fig. 3. It is a method that will prove helpful whenever it is necessary to make a soldered connection in a space too small for the point of the iron to enter.

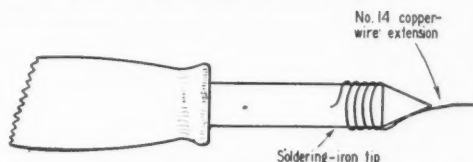


Fig. 3—A handy "extension" for soldering in close quarters may be made of a short length of No. 14 copper wire, preferably pretinned.

A short length of No. 14 bare copper wire is wrapped about three turns around the tip of the iron, with an extension brought out as far as needed past the tip of the iron. The "extension" works best with pretinned copper wire, but any metal that will conduct the heat will do. Have the extension contact the tip of the iron along as much of its length as possible.—*Jerry Morgan, W5ABQ*

ADDING A NOISE LIMITER TO THE CAR RADIO

THE circuit shown in Fig. 4 is a simple means of adding a noise limiter to the car radio, a "must" if it is to be used with a converter for mobile operation. The usual 6SQ7 detector-a.v.c.-first-audio tube is replaced by a 6S8-GT. This tube includes all of the elements required to perform the original functions of the 6SQ7, plus an extra diode that can be used for the noise-

limiter circuits. Thus, it is possible to add the noise limiter without having to try to find room for another tube in an already-overcrowded cabinet.

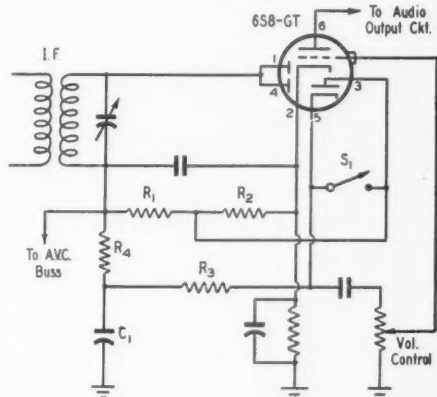


Fig. 4—Here's an easy way to install a noise limiter in your ca. radio. The 6SQ7 usually found in the set is replaced by a 6S8-GT, as shown.
C₁—0.01 μ fd.
R₁, R₂—0.27 megohm, $\frac{1}{2}$ watt.
R₃—0.82 megohm, $\frac{1}{2}$ watt.
R₄—1 megohm, $\frac{1}{2}$ watt.
S₁—S.p.s.t. toggle switch.

No extensive wiring changes are involved, because the 6S8-GT has the same heater connections as the 6SQ7, and the few extra parts needed require very little space. In the diagram, only the added parts are marked. All others shown are already in the set.

The limiter does not seem to introduce any distortion when the set is used as a normal b.c. receiver, surpassing crystal diodes in this respect. Thus the switch is not actually needed unless one wants to demonstrate the effectiveness of the limiter. If the switch is used, the leads to it should be as short as possible.—*Wayne W. Cooper, W8EWC*

THE "MONITONE" AS A 'PHONE MONITOR

THE "Monitone" keying monitor described recently in *QST*¹ may also be used for 'phone monitoring with a simple addition to the original circuit. Thus the gadget becomes doubly useful, and is a good bet for the man who operates both c.w. and 'phone.

Solder a lead from the positive side of the 1N34 crystal diode to the ungrounded side of the 'phone jack through a s.p.s.t. switch. To use the unit as a 'phone monitor, turn the power switch off and close the added switch. For c.w. monitoring, open the new toggle switch and use as described in the original article.—*Paul Hescoc, W1PRE*

¹ Paddon, The "Monitone," *QST*, Sept. 1948, p. 22.



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
J. A. MOSKEY, WIJMY, Asst. Comm. Mgr.
ALBERT HAYES, WIIIN, Natl. Emerg. Coördinator

♦ GEORGE HART, WINJM, Communications Asst.
A. F. HILL, JR., WIQMI, Communications Asst.
LILLIAN M. SALTER, Communications Asst.

Simulated Emergency Test. This October's AEC test of community plans was a humdinger, even better than last year's. New contacts with those served were established. Many hams got a new respect for those able to relay a message in good form with *accuracy*. Some received their first instruction on putting traffic together during the test! New station set-ups were tested in new places. Sets with handles, mobiles, portables and car installations were sent on urgent missions with time in the balance. By Sunday afternoon most tests had been completed and traffic for ARRL and Red Cross began to flow! It was no trickle but a river of traffic from scores of participating individuals and hundreds of alerted installations. It was a joy to hear it move, even under propagation conditions that were not the best.

Locally, amateurs vied with one another to get out the fullest roll call of potential emergency-ready operators in each of several bands. All who were in the test deserve our congratulations and a "well done." It will take some weeks to enumerate the communities heard from and see which SEC's teams chalked up the most-complete reports and radio coverage. The NEC will be looking for the strong reports to give credit where due, and for the weaknesses and lessons always learned from these tests, in order to suggest the revision of community plans and the adoption of added programs for utilizing amateur radio, as may seem necessary.

AEC Invitation. Each emergency coördinator will back us up, we feel sure, when we state that the test showed the importance to many amateurs of *belonging to the ARRL Emergency Corps*. Unless you had gotten lined up for a supporting or full membership in the Corps you didn't *get* any call to action in your community, and you missed not only the fun and practical values in radio testing your equipment under what was tantamount to emergency operating conditions—but, more important, you missed the chance to get a "dry-run" assignment that would develop your ability to serve in a communications status, come a *real* surprise call for use of your radio know-how or gear.

More *supporting* members, those who cannot regularly give a *lot* of time and activity in operating, are needed. Geographical coverage of cities and towns *not* represented in this test is extremely

important. Your section and national officials want more AEC supporting members so we can place the information on emergency procedure and policy in your stations—just in case. ARRL needs your genuine support and, appreciating your business and personal commitments, your EC will not make unreasonable demands on your time. Supporting and full members of AEC are needed, amateurs representing each amateur frequency-band group in every city and town in the nation. Members who have car-installed rigs or lightweight transportable equipment that can be put up in a hurry at a designated spot, work-



THERE IS A PLACE FOR EVERY LICENSED AMATEUR IN THE EMERGENCY CORPS

ing to other amateur stations under advance-planned arrangements, will have key assignments, come a real need for communications. "There's a place for *every* licensed amateur in the Emergency Corps."

Teletypewriter Technique. The story of the development of amateur radio teletype equipment and its utilization between amateurs in a 147.96-Mc. net, as told in October *QST*, is a fascinating one. This field is sure to attract numerous amateur experimenters in view of possible equipment modifications. Also, we'll be pleased to hear of the *operating* applications to fixed emergency amateur-radio facilities as well as to try to keep a complete directory of all amateur stations as they become TT-equipped. A postal card or radiogram to the ARRL Communications Department will assist us in noting your call and the date of your first operation by this method. Every pair (or more) of these machines in a com-

munity should, where possible, be reported to emergency coordinators, with operating frequencies, for advance planning as to possible use in local communications emergencies.

About TT Calling and Logging. FCC, of course, requires that amateur teletype stations identify their transmissions and the other amateur stations that are being called or worked at both the beginning and end of transmissions and once each 10 minutes, just as in the case of other systems of amateur work. To facilitate aural monitoring by FCC engineers, either voice or c.w. telegraph may be used at the proper intervals. Some New York amateurs thought a "commercial was invading the band." So to appraise local groups that this new amateur system of communication is working, some comments identifying the system as one used for regular amateur contact for purposes of record keeping and convenience (not for secrecy) will be found desirable. Log keeping is best accomplished using the usual written-type log, and where a.f.s.k. is used noting that it is a form of A2 emission. It is true that if all the facts required (time, date, signature of licensed operator, names of others that talk or use the keyboard but don't throw the switch, the frequency band, the call of station called, and type of transmission, with any record traffic) are placed on the paper that comes off the machine, *this can be the log*. However, most fellows do not want to keep bales of back-and-forth comment — only the record traffic and legally necessary facts. So our recommendation concerning log keeping for TT is that a regular standard ARRL log form be used, and that the FCC requirements as to calls, times, etc., be recorded as concisely as possible therein as in other kinds of amateur communication.

TT Bands. Where a frequency-shift audio oscillator is used on an amplitude-modulated transmitter (A2) the amateur frequency bands 27.16-27.43, 50-54, and 144-148 Mc. and above, which provide for A2, may be used. However, when true f.s.k. is utilized involving carrier shift, 27.16-27.43, 29-29.7, 52.5-54, 144-148 Mc. and those higher-frequency bands specified for carrier shift in Sec. 12.111 as amended may be utilized.

Clear-Channel Operation. It is a waste of power and operating time to buck QRM when it can be so easily avoided. Never open up and inadvertently jam someone, or be jammed, without listening first. *Rule 1:* Listen before opening up on the air. *Rule 2:* If a frequency is busy, shift to a clearer spot or QRX until the channel is free.

The operation of nets and round tables aids in the efficient use of channels. The bunching-up of several stations to use *one channel* leaves more holes in the rest of the band. One way to insure relatively clear-channel operation is to operate in or as part of a regular net. In that way you get your turn, and the channel, kept in constant occupancy, is thus kept clear, either for relaying a

message along or for delivering traffic. The other way to QRM-free work is to listen carefully and move to clear spots away from the published frequencies of the nets, or off groups of stations noted to be engaged in communication on a particular frequency. You always have to hear a station before you can work him, so why not always listen first?

All of the above applies both to voice and c.w. work. The interference headache belongs to everybody. A good VFO is the most flexible tool for dodging interference, but a few spare crystals will likewise permit you to do the trick. Working through QRM when copying traffic makes the best operators the world has seen. Dodging the QRM by ample listening and by application of operating savvy is an art similarly cultivated by necessity. Increasingly, we amateurs have the know-how and equipment. Consult the ARRL Net Directory, presented in these pages in November *QST*, and note the times and frequencies at which nets operate regularly. These nets ordinarily work for a half-hour or hour a day. In a few cases section nets may then become regional nets on the same frequency. This information, supplemented by monitoring, can help you pick a net best to handle the message you want to put into some particular place; or likewise, a little advance planning supplemented by monitoring will enable you to select the most advantageous spots to work, whether your interest is WAS, rag-chewing, experimentation or traffic. Pick a clear channel before opening up with a CQ. More answers are sure to result. — F. E. H.

A.R.R.L. ACTIVITIES CALENDAR

Dec. 17th: CP Qualifying Run
 Jan. 13th: CP Qualifying Run
 Jan. 15th: V.H.F. Sweepstakes
 Jan. 22nd-23rd: ARRL Member Party
 Feb. 11th-14th: DX Competition (c.w.)
 Feb. 15th: CP Qualifying Run
 Feb. 18th-21st: DX Competition ('phone)
 Mar. 11th-14th: DX Competition (c.w.)
 Mar. 16th: CP Qualifying Run
 Mar. 18th-21st: DX Competition ('phone)
 Apr. 18th: CP Qualifying Run
 Apr. 23rd-24th: CD QSO Party
 May 20th: CP Qualifying Run
 June 4th-5th: V.H.F. Contest
 June 15th: CP Qualifying Run
 June 18th-19th: ARRL Field Day

— . . . —

Jan. 1st-Dec. 31st: Most-States V.H.F. Contest
 First Saturday night each month: ARRL Officials Nite (get-together for SCMs, RMs, SECs, ECs, PAMs, Hq. Staff, Directors, Alt. and Asst. Dirs.)

A.R.R.L. - AFFILIATED CLUB HONOR ROLL

It is a pleasure to present additional Honor Roll affiliated clubs in the following listing, supplementing that which appeared in June *QST*. These are the societies whose entire membership consists of members of the League. The listings of clubs with 100 per cent ARRL membership are in accord with the Board policy of such special recognition, which is determined from information supplied us in the affiliated-club questionnaire or Annual Information Survey conducted as required by the Board. In early 1949 a form will be sent to every active affiliate for filings on which the next Honor Roll will be based.

Allegan Area Radio Club, Allegan, Mich.
Asheville Amateur Radio Club, Asheville, N. C.
Associated Amateur Radio Operators of Denver, Denver, Colo.
Atlantic Radio Club, Inc., Atlantic City, N. J.
Central Kentucky Amateur Radio Club, Lexington, Ky.
Charlotte Amateur Radio Club, Charlotte, N. C.
Delaware Amateur Radio Club, Newport, Del.
East Bay Radio Club, El Cerrito, Calif.
Effingham Radio Club, Effingham, Ill.
Enid Amateur Radio Club, Enid, Okla.
Glendale Amateur Radio Club, Glendale, Calif.
Helix Amateur Radio Club, La Mesa, Calif.
Honolulu Amateur Radio Club, Honolulu, T. H.
Houston Amateur Radio Club, Houston, Tex.
Illinois Ham Club, Chicago, Ill.
Illinois Valley Radio Association, LaSalle, Ill.
Inglewood Amateur Radio Club, Inglewood, Calif.
Intercity Radio Club, Ashland, Ohio
Joliet Amateur Radio Society, Joliet, Ill.
Kickapoo Radio Operators Club, Bloomington, Ill.
Kingsport Amateur Radio Club, Kingsport, Tenn.
MAK Radio Association, Arlington, Mass.
Nashville Amateur Radio Club, Nashville, Tenn.
Neosho Valley Amateur Radio Club, Emporia, Kans.
107th Radio Research Club, Maple Heights, Ohio
Parkway Radio Association, West Roxbury, Mass.
Radio Club of Tacoma, Inc., Tacoma, Wash.
San Francisco Naval Shipyard Amateur Radio Club, San Francisco, Calif.
Skagit Amateur Radio Club, Mt. Vernon, Wash.
T-9 Society, Ocean Grove, N. J.
Valdosta Amateur Radio Club, Valdosta, Ga.
Valley Radio Club, Eugene, Ore.
West Palm Beach Amateur Radio Club, West Palm Beach, Fla.
West Philadelphia Radio Association, Philadelphia, Pa.

WITH THE A.E.C.

The Section Emergency Coördinator post is one of the most important appointments in the ARRL field organization. Acting as the assistant to the SCM in AEC matters, the SEC is responsible for the section-wide AEC organization, the recommendation for appointment and cancellation of Emergency Coördinators, the determination of the jurisdictions of the various ECs, and the promulgation of AEC membership drives, meetings, and activities at section levels. Activity on the air is not a requirement for the post — the SEC must be an executive. It is his responsibility to see that the AEC "works" in every community in his section. Is your SEC doing a good job? If you don't think so, write him a letter and find out what is wrong. If he is doing a swell job, tell him so — he's human, too! The following ARRL sections do not have an SEC appointed to help the SCM in this important field: Md.-Del.-D.C., S.N.J., Vt., Alaska, Idaho, Hawaii, Santa Clara Valley, Philippines, W. Va., Utah-Wyoming, Alberta, Yukon, Manitoba and Saskatchewan. What's the matter, fellows, don't you think disaster can strike your section? *Don't bet on it!*

The gang along the Gulf coast of Mississippi and Louisiana, under the leadership of SECs W5JHS and W5KTE, were not caught napping on September 4th when a hurricane swept in from the Tropics. All nets were alerted in plenty of time, and the operation was carried off in top-notch fashion. The lesson of last year's big wind has not been forgotten.

The *Radio Cadena de Aficionados de Nuevo Leon*, a traffic-emergency net serving the Mexican state of Nuevo Leon and operating on 7100 kc., is now tied into the South Texas Emergency Net on Monday nights. The XEs are shooting for an emergency network covering all of Mexico.

Write W1BB for a copy of his single-sheet diagram of the AEC in Winthrop, Mass., if you would like to see how simple an emergency set-up can be and still be tops in efficiency.

The Puerto Rico Amateur Radio Club has published a detailed emergency manual, which is

Two years of field days! Here's Harold Siebens, W0JPV, with his trailer at Glacier National Park on the first leg of an extended hamming-hunting-fishing trip to Alaska, Guatemala and home. Called the *Siebens Trans American Adventures*, the jaunt represents the fulfillment of W0JPV's lifelong dream to make such an expedition. The trailer houses a 32V1 transmitter, 75A1 receiver. W0JPV works daily when possible on 29,600 kc. at 2100 GCT, 14,092 kc. at 1200 and 1400, 7092 kc. at 1500, and 3592 kc. at 0600.

QST for



available to all amateurs of Puerto Rico and the Virgin Islands. Under the leadership of SCM KP4KD these fellows, who are directly in the path of many hurricanes, plan an AEC second to none in efficiency.

—

The Arkansas Emergency Net has been expanded into a five-day-per-week traffic net, and has been operating busily on 3695 kc. since September 1st.

—

The first storms of winter are almost upon us. Once again we can expect blizzards and ice storms which will sever communications lines, block rail and road traffic, and isolate communities. In past years the amateur service has demonstrated its ability to serve as a stand-by communications facility under such circumstances, and the agencies we serve have been loud in their acclaim of our work. Let us not feel that our past performances are a guarantee of the efficiency of our future efforts. Organization and advance planning are the best insurance we can obtain to protect our record. The AEC, under the leadership of the emergency coordinator in your community and that of the section emergency coordinator in your ARRL section, is presently preparing its master plan for public service during the wintry season. The AEC needs you. Join now!

HAM INTERCOM AT SPORTS-CAR RACES

New York amateurs were called upon to supply communications in connection with a road race sponsored by the Sports Car Club of America and held at Watkins Glen, N. Y., on October 6th. The Binghamton Amateur Radio Assn. was instrumental in arranging a radio communication plan for the event and was assisted in the operation by the Elmira Amateur Radio Association.

After advance testing of the communication situation with mobile units, the BARA group discovered that the rugged terrain over which the race was to be held presented difficult problems. It was decided to set up two networks, one battery-powered on the 75-meter band and the other on 144 Mc. using a.c.-powered surplus 522 units in fixed locations and walkie-talkies to cover specific points where the fixed stations were not practical. One mobile unit was employed which could be directed to points of trouble.

The plan was extremely successful. BARA members left Binghamton at 7:00 A.M. and arrived in Watkins Glen between 9 and 10 o'clock. Stations were immediately set up along the course and after some adjustment of antennas to obtain best communication, were "ready to go." The networks developed into a smoothly-functioning communications pattern as the race progressed. Three accidents happened, one before the race and two during the race, which were promptly

reported to race officials from the control station located at the finish line. No personal injuries were suffered, and this information, of course, was most reassuring, as the accidents occurred at points far from the finish line. In one case, a walkie-talkie was immediately on the job and communications were conducted right from the car.

It was a new experience to us and emphasized the need for higher-powered mobile equipment. We did gain experience in setting up stations quickly under situations approximating an emergency and will be able to do an even better job next time.

Those participating were: 2-meter fixed stations: W2s HJS RLS SFW FCG YLQ JOJ; 2-meter mobile: W2SNC; 2-meter walkie-talkies: W2s RFO SDA WZM; 75-meter net: PWN PQH ARH WBU KIJ. The Elmira Amateur Radio Association was represented in the 75-meter net by W2KIJ and W2WBU.

— J. E. Dayger, W2JOJ
President, BARA

MASSACHUSETTS RACING REGATTA

The 21st Annual Racing Regatta, held at Winthrop, Mass., on September 4th, 5th and 6th, was furnished with a radio net by W1QFI, headquarters station of Flotilla 412, U. S. Coast Guard Auxiliary, based at the Cottage Park Yacht Club in Winthrop.

W1QFI was used as base of operations with a 28-Mc. circuit to the Pleasant Park Yacht Club, where races were formed. A 144-Mc. circuit was used to contact the five mobile-marine units. At W1QFI a 50-watt 6L6-807 rig was used for 10 meters, and a similar unit was in operation at Pleasant Park.

A 522 was employed at W1QFI for 2 meters and the five boat units were TR-4s and transceivers, powered by storage batteries and vibrator supplies. The U. S. Coast Guard patrol boat, which was manned by Auxiliary men, was equipped with 2-meter gear also.

The following members of Flotilla 412 participated: W1s BHD HKG HXK KNA NBV QRR OCQ, and Ed Drake, Don MacFarland and Charlie Pyne. The following additional amateurs also participated: W1s LD LLY OKB RIP, and Art Pugsley.

NATIONAL EMERGENCY FREQUENCIES

C.W.	'PHONE
7100 kc. (day)	3875 kc.
3550 kc. (night)	

During periods of communications emergency these channels will be monitored by stations of the National Emergency Net for the handling of third-party personal-inquiry traffic.

DX CENTURY CLUB AWARDS

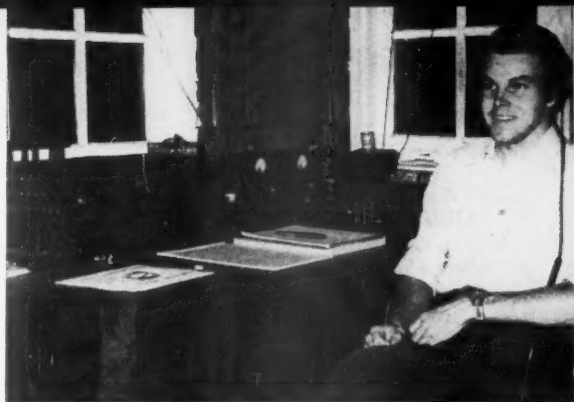
DXCC Certificates based on postwar contacts with 100-or-more countries have been issued to the amateurs listed below. The countries-worked totals indicated have been certified by examination of written evidence under the award rules as published in March, 1947, QST.

W1FH.....207	W3KQF.....146	PA0GN.....128	W9NRB.....117	W3IXN.....104
W6VFR.....194	W8LEC.....145	OZ7CC.....128	W7BD.....116	W6WB.....103
W3BES.....192	W2IOP.....145	NY4CM.....127	W3TIF.....116	W7DXZ.....103
G2PL.....188	W2NSZ.....145	W3FGB.....127	W2ITD.....116	VK2DI.....103
W8HGW.....187	W4BRB.....144	G4CP.....127	W2AGU.....116	W1BLO.....103
W4BPD.....184	W3IYE.....144	W1JYH.....126	W8UDR.....116	CM2SW.....103
W2BXA.....184	W2ALO.....144	W7DL.....126	W6MHH.....115	W1RY.....103
W3GAU.....180	W9IU.....144	W1CLX.....126	W2SAI.....114	W9YNB.....103
G6ZO.....177	HB9CE.....141	W6RDR.....126	W8SDR.....114	W6MLY.....103
W1CH.....176	W0NUC.....141	W3DRD.....125	HB9DO.....113	W6CIS.....103
W2HHF.....176	W3EPV.....141	W6OMC.....125	W2RGV.....113	W8LYQ.....102
W3JNN.....175	W0KOK.....141	W4KXN.....125	J2AHI.....113	EI9J.....102
W1TW.....174	W6AM.....141	W6TI.....124	VQ3HJP.....113	W1JLT.....102
W6SAI.....174	LA7Y.....140	W6BAM.....124	W1FJN.....112	W4INL.....102
W2AQW.....173	W9RBI.....140	W3OP.....124	ZS2AG.....112	GM3RL.....102
W6EBG.....172	W0GKS.....140	ZL1BY.....124	W9AEH.....112	W9VW.....102
W8RDZ.....171	VE3QD.....140	W6RW.....124	W9ERU.....112	G5CI.....102
W9ANT.....170	W6WKU.....140	W8FJL.....123	W3EYF.....111	W8BEN.....102
W2GWE.....169	W1ENE.....140	W4OM.....122	W7GBW.....111	W1AH.....102
W3DPA.....167	LU6DJX.....140	W9NDA.....122	W2UAT.....111	W6AMA.....101
W3QJV.....167	ON4JW.....140	I1IR.....122	W7GUV.....111	W8HRV.....101
PA0UN.....166	W2CWE.....140	W6BPD.....122	W6OBD.....111	W2QKE.....101
W2AGW.....162	W6ZCY.....139	G5OO.....122	OK1CX.....111	W6SC.....101
W3GHD.....162	W4PN.....138	W3LNE.....121	HB9J.....111	W4JV.....101
W1IAS.....161	W6FSJ.....138	W3BXE.....121	W8FGX.....110	W9TWC.....101
W7AMX.....161	W0NTA.....136	W5CPI.....121	W2GNQ.....110	W9FJB.....101
W4CYU.....161	W1BIH.....136	W6GFE.....121	G8IL.....110	W6POZ.....101
W8BKP.....161	W6NNV.....136	W2AFU.....121	ZS6EU.....110	W1NMP.....101
ZL1HY.....160	W2LJR.....135	W6PB.....121	W6MUB.....110	W6TEU.....101
W2QKS.....160	OK1LM.....135	W2PWP.....121	W1BDS.....110	W3LBG.....101
W1ME.....160	W2COK.....134	W9UIG.....121	KH6JJ.....110	W6JZP.....101
W3KT.....160	G8KP.....134	W1ZL.....121	G5YV.....110	W6AYZ.....101
GW3ZV.....160	W4DKA.....134	W7GUI.....121	W9LNM.....110	W2RWE.....101
VE7ZM.....160	W6MX.....134	W1WK.....121	ZS6DJ.....109	W6IBD.....101
W5ASG.....159	W2MEL.....133	W0DAE.....121	W6CEM.....109	W2TJF.....101
W4AIT.....159	I1KN.....133	W6SRU.....121	W1HRI.....109	G6XY.....101
W6GAL.....158	HB9CX.....132	KG6AI.....121	ZL3BJ.....109	G4GI.....101
ZS2X.....158	OK1FF.....132	W3JKO.....121	W6PUZ.....108	W6MJB.....100
W6GHU.....157	W5FNA.....131	W6ANN.....120	ON4QJ.....108	W1BUX.....100
W6MEK.....157	CE3AG.....131	W3DKT.....120	W8ERA.....107	W6DUC.....100
W2CYS.....156	W2TQC.....131	W5LGG.....120	ZL2QM.....107	W3FJU.....100
W5KC.....155	W1DX.....131	W3ZND.....120	W3ZND.....107	W5ENE.....100
W6SN.....155	W6RBQ.....131	W2QCP.....120	W5ADZ.....107	W4KIT.....100
W3CPV.....155	W8FJN.....130	VE7HC.....120	W4FPK.....106	W6VBY.....100
W2DS.....154	W8CVU.....130	W2HMJ.....120	G8TD.....106	I1IV.....100
W8JIN.....153	PA0JU.....130	W2PUD.....120	W4NNN.....106	W2BLS.....100
W2GUM.....153	W6LER.....130	W3KDP.....120	W2JB.....106	W8WZ.....100
W6QJU.....153	W3JTC.....130	ZL2GX.....120	I1AY.....106	W6TZD.....100
W2HZY.....152	W2BRV.....130	W7BE.....119	W1CUX.....106	W6PZ.....100
W1AXA.....151	PY1AJ.....130	W1AB.....119	W4CS.....106	G8FW.....100
W1ADM.....151	W2CZO.....130	SV1RX.....119	W9DUY.....105	W6BVM.....100
W6TT.....151	W6KUT.....130	W1KFV.....118	ON4MS.....105	W2RDK.....100
W9YXO.....151	W0AIW.....130	W1LOP.....118	W6RM.....105	W4KFC.....100
W3EVW.....150	W2UFT.....130	W6LDJ.....118	W6KRI.....104	W1EQ.....100
W8NBK.....150	W4MR.....129	W5BGP.....118	G3FJ.....104	G2BQC.....100
W7FZA.....148	W2QHH.....129	W4FIJ.....117	W8SQO.....104	W3FUF.....100
W6DI.....148	W4JXM.....128	G4JZ.....117	W1DF.....104	
W3RCQ.....147	G2AJ.....128	W8UAS.....117	G3AZ.....104	

RADIOTELEPHONE

W1FH.....168	W2AFQ.....125	ZL1HY.....113	W5BGP.....110	G6WX.....101
W4CYU.....139	G2ZB.....125	W8BF.....112	W1GOU.....110	W2RGV.....101
W1JCX.....138	W8REU.....124	W2APU.....112	W3DHM.....110	W1BEQ.....101
W6DI.....135	VQ4ERR.....122	W9RBI.....112	W5ASC.....108	W2UAT.....101
G2PL.....134	W3JNN.....121	W2QF.....112	T12OA.....106	G4JZ.....101
XE1AC.....133	W2ZW.....120	W1FJN.....111	SUIHF.....105	W9NDA.....100
W6VFR.....130	W1NWO.....120	W8KML.....111	W9FHZ.....104	W4EWY.....100
W1HKK.....128	W1MCW.....119	W1LMB.....111	LX1SI.....104	W1HRI.....100
W2BXA.....126	W1ADM.....113	G3YM.....110	W7HTB.....102	

John Cann, W3IEM, keeps Baltimore, Md., on the traffic map from this neat low-power layout. Messages arrive on a BC-348J receiver and leave via a doublet antenna and a 6L6-807 rig running 75 watts input. W3IEM is ORS, AEC, WAS, RCC, active on the Swing-Shift, Md.-Del.-D. C. and Virginia traffic nets. A skilled c.w. operator, John holds a 35-w.p.m. Code Proficiency Certificate, attained by copying with a pencil, and membership in the A-1 Operator Club.



TRAFFIC TOPICS

Stations in the more isolated locations frequently find traffic operation dull because they have few messages to handle. Thus, their interest lags. If you are in this position, originate traffic to friends in other parts of the country; some are bound to answer by radio and start the ball rolling. Originations help to build traffic activity for your net, and those nets through which they must pass, and will bring returns to help your deliveries. Let's try it!

WIQFI, the amateur station operating with Flotilla 412, U. S. Coast Guard Auxiliary, operates every Wednesday night on 3815, 3910 and 29,060 kc. Other amateur stations on the Atlantic Seaboard collaborating with the USCGA are requested to contact WIQFI for schedules.

The Vermont C.W. Net is in operation on 3740 kc., Monday through Friday, at 7:00 P.M. EST. Outlets include TLC, Eastern Mass. and Conn. Nets. Plans are under way to form a 'phone net on 3860 kc.

The Chattanooga Amateur Club operated W4DIJ/4 at the Chattanooga Inter-State Fair in September. Some 200 messages were originated and relayed during the four-day festivities. The transmitters were located in a trailer operating on 80 and 40 c.w., and 20-meter 'phone.

A recent issue of the *Southern Border Net Bulletin* contains a note worth repeating, and food for thought for all traffic men. "Let's not become complacent about our operating skill. All stations are urged to copy all traffic handled on the net and to listen in on other nets to increase speed and to become familiar with procedures. Copy five or six words to the line to facilitate check of word count. *Originate traffic.* Know the "Q" and "QN" signals and use them. An efficient net wastes no time in unnecessary transmissions."

The Lakeland Amateur Radio Assn. of New Jersey set up a booth at the Morris County Fair during September. The set-up included a transmitter on 80 and 40 c.w., and another on 2-meter 'phone. Over 250 messages were handled.

The Ozark Net in Arkansas is now operating on a Monday-through-Friday schedule on 3695 kc. The net meets at 7:00 P.M. CST with good coverage of the state.

Many new emergency nets are springing up to tie into the existing traffic networks. If your emergency net is not listed in the latest *Directory of Active Nets*, drop a line to Headquarters giving the frequency, times and days of operation.

The *Traffic Outlet Bulletin* has brought forth a good suggestion to eliminate the confusion between Washington State and Washington, D. C. "When you have traffic for the Nation's Capital, let's classify it as 'DC' and not as 'WASH.' Therein lies a source of confusion. In case you haven't heard, there is a state by that name 'way out yonder somewhere.'"

The Michigan QMN Net is operating on a three-speed schedule. At 5:00 P.M. EST the speed is 15 w.p.m. or less; at 6:00 P.M. EST, between 15 and 20 w.p.m.; at 7:00 P.M. EST, 20 w.p.m. or over. This gives opportunity for amateurs of all speeds to participate in their section-net activities. "QMN" meets Monday through Friday on 3663 kc.

BRASS POUNDERS LEAGUE

(September Traffic)

Call	Orig.	Del.	Rel.	Extra Del. Credit	Total
W6REB	21	12	2402	8	2443
W7CKT	5	40	2314	36	2395
W6JN	1624	3	0	0	1627
W5GZU	3	15	1210	11	1239
W6PIV	10	17	778	17	822
W2SNK	16	15	521	9	561
W5MBV	8	16	511	9	544
W6ZF	—	—	531	—	531
W8TRN	5	50	423	44	522

The following make the BPL with over 100 "deliveries plus extra delivery credits":

W6YDK 248	W6OT 116	W6NL 111
W6RAD 178	W2VNJ 114	
W6CMN 133	W6DDE 111	

A message total of 500 or more, or 100 "deliveries plus extra delivery credits," will put you in line for a place in the BPL. The Brass Pounders League listing is open to all operators who qualify for this monthly "honor roll."

TRAINING AIDS

Rules. The mimeographed "Rules for Use" of ARRL Training Aids were devised for the purpose of making more Training Aids available to more affiliated clubs on a planned basis. The rules made were considered necessary in order that the material we have on hand could be used by as many affiliated clubs as possible. The rules were made to be read and observed by the clubs using Training Aids.

We never thought them very complicated. First there is a set of general rules, which applies in general to all Training Aids; and this is followed by separate sets of special rules for each type of Training Aid available. If you are using films, you will want to read the general rules, and then the special rules applying to films only. If it is a recorder or keyer you are interested in, you will want to read the rules that apply.

Most of the clubs who request Training Aids have a copy of the rules and Training Aids list beforehand, and make their requests on a regular request form supplied by us — which says, incidentally, that they "have thoroughly read, understand and agree to comply with all rules applicable to the Training Aids requested." And yet repeatedly, in at least one out of every three requests, the type and quantity of the material requested somehow indicates that *the rules were not read*, or if read, not understood.

What goes on, fellows? Do you actually read these rules, and understand them? Or do you simply glance over them and think that this qualifies you to sign a certification indicating that you have "thoroughly read and understand" them? When you make a request for Training Aids, we assume that you have *read and understood* the rules. If you do not understand them, write and ask us for a clarification; but we'll bet that if you read them thoroughly and carefully, you will have no questions.

Malpractice. While we are in a griping mood, let us get one more off our chest. A good many clubs, of late, have made proper requests for Training Aids, which were duly booked and shipped, only to be returned later with a letter which says that they were unfortunately unable to use them. In one classic case, six films were sent in succession over a period of many months, and all were returned without completed questionnaires. When we later requested the completion and return of the questionnaires, the club secretary informed us that they had not been able to use any of them, and that was the reason no questionnaires had been returned.

Please, fellows, make sure of your arrangements before you request Training Aids. You are causing us, yourselves, and other affiliated clubs waiting in line no end of inconvenience when you cause us to make a booking of material you cannot use.

MEET THE SCMs

Ben H. Wendt, W0ICD, SCM Missouri, began his career as a licensed radio amateur in 1931 and has been consistently active on the air since that time. His first eight to ten years in the ham game were devoted to c.w. on 160, 75 and 40 meters. He got his start in Milwaukee, Wis., as W9ICD and later operated from Alma, Lexington, and Kansas City, Mo., before moving to his present location north of North Kansas City.

Ben is constantly experimenting with new and different ideas, the most recent being with 28-Mc. antennas. His rig seldom bears the same description for any length of time. At present the 'phone rig is a 6L6 oscillator driving a pair of 6L6s at 60 watts input, modulated by p.p. 6L6s, while for c.w. an 812 running at 150 watts input is added. Receiving equipment includes an S-20 with pre-selector, and a converted BC-454. On 27 and 28 Mc. W0ICD uses a three-element rotary beam; on all other bands a long wire is worked against ground. The 'phone portion of the transmitter is portable and there is an auxiliary folded-dipole antenna for 27- and 28-Mc. portable operation. Ben's favorite band is 28 Mc., although the transmitters actually cover 3.85- and 3.5-Mc. 'phone and c.w., 7-Mc. c.w., and 14-, 27-, and 28-Mc. 'phone and c.w. The rig is situated in the recrea-



tion room of the Wendt home overlooking Chaumier Lake.

Holder of a 25-w.p.m. Code Proficiency Certificate and a Rag Chewers Certificate, SCM Wendt is a member of the Heart of America Radio Club and of the AEC and is a regular reporter on the AEC Net.

In addition to ham radio, Ben has such diversified interests as photography, philately, fishing, swimming, skating, horseshoe pitching, checkers, cards, and softball, and for two successive years captured a spot on the City Softball League all-star team.

Having completed an extension course in electricity and radio at the University of Wisconsin, Ben is now in the employ of the Berg-Gibson Mfg. Co. as an electrical engineer.

CODE-PROFICIENCY PROGRAM

Have you received an ARRL Code Proficiency Certificate yet? Once each month special transmissions are made to enable you to qualify for the award. The next such qualifying run will be made on December 17th at 10:00 P.M. EST. Identical texts will be sent simultaneously by automatic transmitters from W1AW, W6OWP and W0CO. Frequencies of transmission from W1AW will be 3555, 7215, 14,150, 28,060, 52,000 and 146,000 kc., from W6OWP 7248 kc., from W0CO 3534 and 7053 kc. Send your copies of the qualifying run to ARRL for grading, stating the call of the station you copied. If you qualify at one of the five speeds transmitted, 15 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions are made from W1AW each evening, Monday through Friday, at 10:00 P.M. EST. Take advantage of these transmissions to increase your code proficiency. References to texts used on several of the practice transmissions are given below. These make it possible to check your own copy. To get sending practice hook up your own key and buzzer and attempt to send in step with W1AW.

Date	Subject of Practice Text from October QST
Dec. 3rd:	<i>A New Principle in Two-Band Rotary-Beam Design</i> , p. 11
Dec. 7th:	<i>The Story of Amateur Radio Teletype</i> , p. 16
Dec. 9th:	<i>Simple Crystal Control on 144 Mc.</i> , p. 22
Dec. 13th:	<i>Further Advances in Electronic-Keyer Design</i> , p. 27
Dec. 15th:	<i>A "Hot" Converter for 220 Mc.</i> , p. 31
Dec. 17th:	Qualifying Run, 10:00 P.M. EST
Dec. 21st:	<i>Completing the Surplus-Parts Bandswitching Transmitter</i> , p. 36
Dec. 23rd:	<i>Technical Topics</i> , p. 45
Dec. 27th:	<i>The Eyes Have It</i> , p. 50
Dec. 29th:	<i>The World Above 60 Mc.</i> , p. 52

BRIEFS

After using commercial station WSL as a regular source of code practice while studying for his license, OM Murphy of Fairmont, West Va., suspected the work of pixies when his ticket came through with the call W8WSL! His hours of listening to WSL are reflected in the melodious way he sends those letters!

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The Tulane University Amateur Radio Club is sponsoring the International Federation of University Radio Clubs, an organization dedicated to the fostering of coöperation between university radio clubs. Initial aim of the Tulane group is to coördinate a list that will include: (a) colleges that have amateur radio clubs, (b) such clubs that have active amateur stations, (c) clubs that desire to work into a net with other schools. Clubs interested in joining the Federation are requested to get in touch with Phil Slipakoff, W5LDH, President, T.U.A.R.C., 3312 Louisiana Parkway, New Orleans, La.

ELECTION NOTICE

(To all ARRL Members residing in the Sections listed below:)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be in West Hartford, Conn., on or before noon on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reason of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested:

Communications Manager, ARRL [Place and date]
38 La Salle Road, West Hartford, Conn.
We, the undersigned full members of the
..... ARRL Section of the
Division, hereby nominate
as candidate for Section Communications Manager for this
Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

—F. E. Handy, Communications Manager

Section	Closing Date	SCM	Present Term Ends
Mississippi	Dec. 15, 1948	Harold Day	Oct. 15, 1948
Oklahoma	Dec. 15, 1948	Bert Weidner	Oct. 15, 1948
Hawaii	Jan. 14, 1949	John F. Souza, jr.	Jan. 2, 1949
Southern Texas	Feb. 1, 1949	Ted Chastain	Feb. 15, 1949
Minnesota	Feb. 1, 1949	Walter G. Hasskamp	Feb. 17, 1949
Maine	Feb. 1, 1949	F. Norman Davis	Feb. 17, 1949
Michigan	Feb. 1, 1949	Joseph R. Beljan, jr.	Feb. 17, 1949

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections, as provided in our Constitution and By-Laws, electing the following officials, the term of office starting on the date given.

Arkansas	Marshall Riggs, W5JIC	Aug. 16, 1948
Colorado	M. W. Mitchell, W0IQZ	Sept. 15, 1948
Canal Zone	Everett R. Kimmel, KZ5AW	Sept. 15, 1948
British Columbia	J. Hepburn, VE7HP	Sept. 15, 1948
Illinois	Lloyd E. Hopkins, W9EVJ	Sept. 30, 1948
Northern Texas	Joe G. Buch, W5CDU	Oct. 15, 1948
Kansas	Earl N. Johnston, W0ICV	Oct. 29, 1948

In the Rhode Island Section of the New England Division, Mr. Roy B. Fuller, W1CJH, and Mr. John Titterington, W1EOF, were nominated. Mr. Fuller received 64 votes and Mr. Titterington received 53 votes. Mr. Fuller's term of office began October 1, 1948.

In the Ohio Section of the Great Lakes Division, Dr. Harold E. Stricker, W8WZ, and Mr. J. R. Wildman, W8UJ, were nominated. Dr. Stricker received 352 votes and Mr. Wildman received 215 votes. Dr. Stricker's term of office began October 1, 1948.

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Jerry Mathis, E3WBES — DZ visited QEW while on vacation in the Poconos. The Springfield, Mass., and Trenton, N. J., Fairs pushed up the traffic totals. T.v. is keeping EU QRL. EU has all kinds of antennas down on the farm. ELI finds 3.85-Mc. phone and 28 Mc. too crowded and 50 Mc. too dead. NNV has given his antennas a good going over in preparation for winter and is arranging his shack for the most efficient operation. The Philadelphia Wireless Assn. meets at the North Light Boys Club, Green and Silverwood Sts., Manayunk, at 8:15 p.m. every Th. rday. The call is 3G4G and the club now is ARRL affiliated. OCU received his DXCC cards 7 months after getting his ticket. 3OVV is KT's ten-year-old daughter. BBV will resume as OO. MIV, OO, is checking the 3.85 Mc. phones for harmonics. HPD lost his u.h.f. resonator dual beam in a wind storm early in October. ISE is doing an FB job as EC for Philadelphia and Delaware Counties. Participation in the Simulated Emergency Test reached a new high. CPV, EKK, and BES visited the American QSL Bureau in Newark, N. J., and brought back a lot of valuable DX cards for the local lads. Traffic: W3NHI 305, VMF 83, QEW 75, ELI 61, DZ 56, KFA 54, AQN 32, BBV 23, OML 13, EU 2.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Eppa Darne, W3BWT — The Industrial Home School Amateur Radio Club of Washington, D. C., has OQJ, pres.; OQP, vice-pres.; and JTZ, trustee. There are four student trainees, and the Club has added some good testing equipment. A new power supply and antenna is being completed. Plans for a Club hamfest and two-day portable operation on Skyline Drive are being completed. Meetings are held once a month, plus Friday evening "get-togethers." Visitors are welcome. At its September meeting the Washington Radio Club presented a talk by Lt. Gerald White, LTR, on "Practical Considerations in High Fidelity." The Washington Mobile Radio Club recently received its charter as an ARRL affiliated club. It now has 63 mobile units in the Washington area. The Delaware Amateur Radio Club's present officers are GZH, pres.; NSC, vice-pres.; KNU, secy.; and GL, treas. The FCC has assigned the club station the call W3SL as a memorial to J. A. Barkley, a past-president, who was the first licensed amateur in Wilmington and a charter member of the club. The club now holds two meetings each month, and has 79 regular members. GKP spent several months during the summer at Wright Field, Ohio. KUX has become a confirmed t. v. addict. EYX recently got his first Code Proficiency Award and worked a KZ5 on 7-Mc. c.w. IL is on 14 Mc. with indoor antenna using 100 watts and has worked 60 countries. MYM is newly-appointed ORS and operates on 3.5, 7, 14, and 28 Mc. CDL is now EC for the Washington, D. C., area. MO has new three-element rotary beam for 14 Mc. IEM is on 7 and 420 Mc. OIU, who recently received his ticket, and EC are on active duty at NRTC, N.G.F. The gang at NRTC extends good wishes to QL in his new billet at Navy Communications Annex. IRA is "doing it inductively" now. JNN is "DXing." EZV works more DX on his piece of wire strung in the dining room than he did with his "8JK." EQK visited a number of Canadian hams while on vacation with his XYL, and has worked 68 countries on 14-Mc. phone. IKX of "do it inductively" fame finally has decided to tune his beam. LUE still is battling TVI. AQV is back from vacation and is building surplus gear into a 144-Mc. rig. JJD is busy with work. AKR is on again, after being in the hospital for an operation. IEM operates daily on Swing Shift 7-Mc. Net. LVJ has been inspecting gear for C.A.A., has rig on 7 Mc., and has new antenna ready to go up. CJS has one more state to get for his WAS on 7 Mc. IYE has a new three-element 14-Mc. rotary beam. KAT has two-element beam and gets out well. KHU and GZH are constructing 14-Mc. rotary beam. JEW has good success working extended ground wave, with three-element beam and pair of 807s.

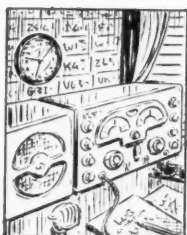
LEU, FHY, and NLP are constructing rigs for 28 Mc. GL has a converted "handie-talkie" that works nice on 28 Mc. KET and OHK work duplex on 28 Mc. CGV and others attended 50-Mc. get-together in North Jersey. KEJ and MDL are on 144 Mc. KI is back on 144 Mc. with a six-element beam. LZN is back on 144 Mc. MZQ lost his sixteen-element 144-Mc. beam in high wind. DQZ has rebuilt his 522 outfit. Traffic: W3ECP 91, AKB 75, MJQ 48, QL 32, OPG 21, BWT 12, EQK 8, JZY 7, JHW 6, AKR 5, IEM 5, MYM 4.

SOUTHERN NEW JERSEY — SCM, G. W. (Bill) Tunnell, W2OXX — Fall outings are very popular this year; the 3.85-Mc. Emergency Net plus the Cumberland and the South Jersey Clubs sponsored October affairs. Traffic honors go to SKX, who made BPL this month. RG has the 3700-ke. net in action again. ZI has been appointed New Jersey Terminal Station for the National Trunk Line. BAY is spending a week aboard his 36-ft. boat — portable marine. (Some life.) BEI continues to persevere with his "OO" work. CFB is active from his new QTH in Toms River. WTJ is now attending Lehigh University, so look for him signing 3AEQ. ORS is hard at work with his emergency group in Burlington County, but would appreciate hearing from some of you at the ocean end of that county. The New Jersey 75 Meter Amateur Radio Emergency Net began its fall activities with thirty-one members. OXX has a new jr. operator, with the resultant temporary inactivity. OSB reports that his dad now is ZEB. WUP uses a converted APS-13 on the 420-Mc. band. WLP is ex-6UMI and 7UMI and is active on the 7- and 14-Mc. bands. ZBE is a new ham and is located in Pennsgrove. Traffic: W2SXX 561, SUG 168, RG 34, ORS 29, ZI 27, BAY 15, QUH 14, BEI 12, HAZ 4, WTJ 1.

WESTERN NEW YORK — SCM, Harding A. Clark, W2PGT — SEC: SJV, RM: FCG. The New York State Traffic Net is now in full swing, with a bigger and better season in prospect. In response to many requests, this season we are running a slow speed net, known as the Straight Key Net, at 6:30 p.m. on 3720 kc. Anyone interested in starting traffic work is invited to join. JOJ, WZM, HJS, SFW, RLS, YLQ, FCG, SNG, RFO, and SDA on 144 Mc., and PWN, WZM, PQH, ARH, KIJ, and UBU on 3.85 Mc., operated portable at the Grand Prix Automobile Road Race at Watkins Glen over a 6½-mile course. The primary purpose was to report accidents, secure ambulance and wreckers if necessary, and stop rail traffic. The secondary purpose was to serve as check points. Hats off to this gang, who ran two complete nets and very favorably impressed officials of the race and spectators. There are numerous events of this kind that offer very good opportunity to test emergency equipment under "field" conditions. The Oneida Radio Club covered Oneida Lake yacht races with 144-Mc. set-up. PXA covered the golf championship match with 3.85-Mc. mobile in a Jeep. GMF is building bandswitching kw. rig. QNA won first prize at VE Hamfest liar's contest. New officers of Niagara Radio Club are KHO, pres.; and RGO, vice-pres.; and OWQ continues as secy-treas. WOE is NCS for T.L. "A." BLO has new YL harmonic. FEB worked 3BGT of Pittsburgh, Pa., on 28-Mc. groundwave and is heard occasionally on 3.5-Mc. c.w. QHH is up to 142 countries postwar. WEN now is 7WEN. SWC now operates at VE8MA, the most northern ham station on the Continent, and schedules QHH. AOR worked 6GBS and PY7WS with low power on 7 Mc. RARA meets the first Thursday of each month at Rochester Museum, 657 East Ave. Call WFU, phone Charlotte 0272-M, for particulars. WFU is publishing an FB bulletin for RARA. Ex-8MHU now is YXC. ZAT is new call in Watertown. HZP works 28-Mc. mobile. The Rochester DX Assn. started the season with FBA as chairman; QCP, vice-chairman; and UPH, secy-treas. New officers of KBT are RUC, pres.; PVL, vice-pres.; EWT, secy.; and SSS, treas. CYV is s.s.s.c. CGU is on 3.85-Mc. n.l.m. The Syracuse Radio Club meets the 2nd and 4th Thurs. of each month in Red Cross Bldg. Contact NCK for details. Traffic: (Aug.) W2WU 41, SJV 20, YVH 9, (Sept.) W2RUF 108, WOE 97, WZQ 66, QHH 41, WFU 41, PGT 31, UYG 25, SJV 20, UTF 12, AOR 8.

WESTERN PENNSYLVANIA — SCM, Ernest J. Hlinsky, W3KWL — The Western Pa. ORS Traffic Net opened its fall and winter season Sept. 27th with NCJ, GJY, and KKA taking turns as Net Control Station. Those active are LWN, NUG, GJY, NCJ, LOD, KWL, YA, LQQ, LIW, KQD, LJQ, KKA, UVD, and YDI. Anyone interested in ORS, contact NUG or your SCM for details. Up in Warren, BOZ reports that TOJ is in Texas. NQA is being groomed as EC for Warren County. BOZ still is working 28-Mc. mobile. Up Erie way, NCJ reports having

(Continued on page 70)



WE ARE very fond of fresh-opened Cape Cod oysters served raw on the half shell together with a small cup of tomato sauce seasoned with horse-radish and tobasco. If you are an oyster-lover, you will know what we mean. If you have never tasted oysters, you should visit the best seafood restaurant in town without delay and try an order. Don't try just one and mouth it gingerly and decide that that's enough. Eat the whole order. When you have finished, you will either call for another plateful or declare that you never want to taste the awful things again as long as you live.

Perhaps radio receivers and oysters do not have much in common, but the point we are trying to make is that if you are a ham or an SWL and have never had a National receiver in your shack, you may be missing just the type of receiver performance that you have always wished for. Thousands of satisfied owners swear by their National receivers. Of course, a few swear at them, too, when failure of some component puts a crimp in the excellent performance they have come to expect.

All this tub-thumping is, we realize, quite out of line with the non-commercial type of article we usually present on this page, but we have always tried to give you helpful information here and our confidence in our product is such that we believe urging you to try a National receiver is asking you to do yourself a favor. Of course, if you do, it will not do us any harm either!

Changing the subject, we wonder if you fellows who bought NC-173 receivers when they first appeared on the market have noticed that this model as currently produced has ventilation openings in the rear of the cabinet. This ventilation is not the only change; a bi-metallic temperature compensating element is used in the H. F. Oscillator section of the tuning condenser with marked improvement in temperature/frequency characteristics. This arrangement was worked out during development of the more recent NC-183 and we felt it well worth incorporating in the NC-173.

When making this change, we realized that many owners of the earlier NC-173 would like to avail themselves of its advantages. We have, therefore, made available a modification kit carrying the designation VMK-173. The price is \$6.75 and your National distributor can order it for you if he does not have it in stock.

SETH CARD, W1DRO



a new 3.5-Mc. half-wave antenna. His latest DX on 14 Mc. are SM, KG, HH, and CN. Up northeast, LWN is working on 144 Mc. and was heard by KWL. Ed is looking for W. Pa. 144-Mc. contacts. MOT, in Dubois, is toying with 144 Mc. Down Pittsburgh way, AER reports that RAT is leaving the district to become a W6. KXU is using gas-filled coax with excellent results. RIS still knocks off DX on 14 Mc. in spite of using 200 per cent modulation. NT has moved to Maryland but continues to report into the W. Pa. ORS Net. VNE reports that violations by hams are at a minimum and that LFM has returned to school in Miami. NBU/NGW has made the "supreme sacrifice" by getting married Sept. 11th. NUG has been appointed Chief Route Manager. YDJ has applied for ORS appointment. UVD sends in his good items. The Wesco Radio Club now meets at the Bell Telephone Garage the 1st and 3rd Thursdays of each month. Interested parties are invited to attend these meetings. GRZ has a new VFO. ORP and NJH have 28-Mc. mobile transmitters. OOI is sporting 28-Mc. beam. UVD still is adding new equipment. FIH's new QTH will be Beloit, Wis. UVK has returned from a nice vacation. Over in Uniontown, UUZ reports that the Fort Necessity Amateur Radio Club is nearing completion. New officers are BCY, pres.; WVE, vice-pres.; LAC, treas.; UUZ, secy.; RUK and RUW, trustees; UHG, historian. The Mercer County Radio Association participated in the recent VHF Contest, with GEG, AH, KQA, KWL, OAJ, NCD, NDD, ODB, 8SFG, and MQW taking part. Traffic: W3GJY 164, NCJ 86, AER 16, KWL 5, LSS 4, LIW 2.

CENTRAL DIVISION

ILLINOIS — SCM, Lloyd E. Hopkins, W9EVJ — Your new SCM hopes to keep up the good work that AND has done the past two years. EVJ visited Dixon and Sterling hams. AND is busy installing new furnace. KQL has been appointed Chief RM. SYZ now is RM in Chicago. SWO is new OO. QIE, AQH, CMC, EAM, LIN, and VOA are new traffic men on ILN. DOQ says several neighbors of his are getting ready to become hams. BUK reports DUA was active during recent hurricane emergency. HPG reports the Chicago Radio Traffic Assn. is celebrating 25 years of regular meetings and ARRL affiliation. FRP has new Collins 32V1 rig. DXL is back in the traffic nets. AQH is getting new 150 watt ready for action on 3.5 Mc. W9QKJ/D4 is on temporary duty in Berlin. JMG says his XYL is studying for her ticket. LQP has new two-element beam on 28 Mc. RSM complains of QRN from jr. operator's new tricycle. MUD is gathering parts for new beam. The Society Radio Operators held a big Fall Festival on Nov. 20th in Logan Square Masonic Temple, Chicago. The Starved Rock Radio Club reports visits from AND and UQT. QLZ has obtained 40-ft. tower. BIN is getting results on 3.5-Mc. 'phone. IDA is struggling with 14-Mc. beam. ZPC has moved to a better QTH. FDF is busy working Gs. The Illinois Valley Radio Assn. reports via ACJ that the club has obtained new quarters. IQC had his KP81 fall face down on the floor. JVC, ACJ, and OLM are busy putting up skyhooks. BJA is sporting new receiver and VFO. JTX is back home after a long rest in Iowa and sends in a nice traffic total. EJX is specializing in portable mobile rigs at present. The Elgin Amateur Radio Society is getting ready to set up its emergency station in new location on the lot owned by PQH. KQL painted his house during vacation. UQT was heard on ILN several times this month. Doc reports that IEN will be the largest in its history this year. FB! DXK went back to classes at Purdue. IAJ is moving to new QTH. SXL is working madly on new home so he can get back on the air. FIN is busy organizing emergency networks in the southern part of the State. Let's have those station activity reports, gang, and help keep our section in the news. All inquiries to your SCM will be handled promptly. Traffic: W9EVJ 152, KQL 124, JTX 107, CMC 82, AQH 55, CTZ 53, DOQ 42, DXL 37, SYZ 36, ZPC 24, LQP 18, LIN 10, RSM 10, FRP 3.

INDIANA — SCM, Charles H. Conway, W9FSG — QIN opened for the fall season with BCJ, BKJ, CBA, ENB, DKV, EQN, FSG, HUV, MKM, NH, PMT, QLW, RCB, SNQ, SWH, TBM, and TT reporting in. BCJ, ENB, MKM, and RCB are the Net Control Stations. If you are interested in traffic handling, write the RM, RCB, R.R. 1, North Liberty. KTX, North Liberty, is on 7 Mc. QLW and DGA, of Evansville, renewed ORS appointments. UIA, Evansville, is back on 28 Mc. after a long stay on 54 Mc. Ralph says no signals were heard on 54 Mc. throughout the entire month. BKJ, Fort Wayne, has a new electrical key run by a synchronous motor. FFV and EMT, Lawrenceburg, have joined the Emergency Corps. BNS is visiting in New Mexico with a 28-Mc. mobile rig. CKP, Indianapolis, received his 99th country QSL and a jr. operator named Robert on the same day. The Indianapolis Mobile Emergency Net now has eight active members: CKP, CUE, CZO, HKZ, PMM, OVF, TXL, UEM, and ZCE. YB, the Purdue Radio Club, is planning on a big traffic season. ENB, Ft. Wayne, has new antenna which makes his 90 watts sound like 900. FLD is new call in Indianapolis. Traffic: W9NH 113, BCJ 46, RCB 32, KTX 29, TT 27, PMT 24, DKV 23, DOK 20, FSG 16, ENB 11, HUV 2.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM —

Badger Emergency Net, 3950 kc., 6 p.m. daily. Wisconsin State Net (C.W.), 3775 kc., 6:30 p.m. Monday through Friday. WIN now is running a 15-w.p.m. state net at 6 p.m. on 3775 kc. CIH is putting up a four-element rotary on 14 Mc. The Northern Wisconsin Radio Club held its annual banquet meeting at Menomonie. Newly-appointed ECs are: AH, Chippewa Falls; WDK, Menomonie; DNB, Barron. Are you a member of the AEC? Does your community have an Emergency Coordinator? If not, write your SCM for details and application blanks, and have your local club recommend an EC for your area. ESJ has received OBS appointment, and is active in transcontinental 'phone net organization. ZTO just put a dual 14- and 28-Mc. rotary, with prop-pitch motor for rotor. GIT has 3.85-Mc. mobile in the car. BDJ received his Class A ticket. 8ZIB and 9CCF have moved to Wausau. MRAC displayed the amateur station set-up at the Wisconsin Centennial Exposition to 1,787,000 visitors. Participating in the station's operation were UMX, VQD, BNN, SYT, SIZ, HPZ, EKU, SUF, NVQ, FAD, GIL, LZU, and RUF. DND and DSP are burning up the ether with their electronic bugs. BKP is experimenting with new Clapp high-stability oscillator circuit. CGO moved back to the old DX location and will be gunning for it with the new beam. MUM and ZGL attended the ARRL National Convention. A new call at Eau Claire is ERW. HSL is working on his new 400-watt rig. The Milwaukee 144-Mc. AEC Net is being reorganized for improved operation and flexibility. Traffic: W9ESJ 123, LFK 111, SZL 62, CBE 38, IQW 36, SIZ 35, CWZ 17, CIH 16, DND 10, MUM 5, RQM 3, DKH 2.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Paul M. Bossolotti, W0GZD — ZCM and SSW shape up West No. Dak. Net FB. It meets every Mon., Wed., and Fri. at 7:30 p.m. MST on 3670 kc. EOZ heads 75 Fone Net on 3880 kc., with JWY and CDO his alternates. WFO is building a new rig. GWU is going to build a pair of 809s. New call in Minot is LNA. GZD kicked the power up to 600 watts. JWY sends official bulletins on 3880 kc. every Tues., Thurs., and Sat. at 7:00 p.m. CST and Sunday at 2:30. UNU is giving 28 Mc. heck. New officers of the Forx Amateur Radio Club are VAZ, pres.; GZD, vice-pres.; and IKD, secy.-treas. DM contemplates 'phone on 28 Mc. with Q antenna. HDD plans new beam. The few states left for WAS are big goals for ILT in Williston. ELX, in Forx, is getting out good on 7 Mc. HSM has two-element 14-Mc. beam up. Lots of good state-wide ragchewing is going on in the 3.5-Mc. c.w. band. Traffic: W0GZD 12, ZCM 2.

SOUTH DAKOTA — SCM, J. S. Foasberg, W0NGM — GCP, the RM and NCS, reports that the South Dakota Section Net now is in operation Monday, Wednesday, and Friday at 8:00 p.m. CST on 3720 kc. The speed will be 10-12 w.p.m. Emergency drills will be held regularly and QNC messages will be sent at intervals, receipt of which will be acknowledged by radiogram to NCS. This will provide traffic-handling practice especially for new-comers and acquaint you with QN signals. SN Certificates will be issued to stations reporting in regularly. IWE and BLK covered the Soap Box Derby in Rapid City with the aid of the BHARC and two 28-Mc. mobile units. A picnic was held near Pierre on Sept. 21st and a good time was had by all. It has been reported that DOP has beam fever and is working hard at this project.

MINNESOTA — SCM, Walter G. Hasskamp, W0CWB — After 25 years in the W3 district, 3QP has moved to St. Paul. JNC's activity is mostly DX with Hawaii and Okinawa schedules. HEO is rebuilding — a kw. on each band! SW put a second relay box on the top of his rotary beam so he can switch from 14 to 28 Mc. BOL finally made WAS! It took 25 years and a kw. on 3.5 Mc. to do it. RJF is our new RM. Please do your share by joining one of the Minnesota State Nets. GVO has a new beam up working fine. EHO's QTH is now Blue Earth. ILX has a BC-457 and runs it entirely from dynamotor power supplies as he is not connected to a.c. power line. His BC-312 receiver also runs off a dynamotor and he keeps his batteries charged with his 32-volt house lighting. In other words, he's always on emergency power. BEI has a BC-654 going on 3.85 Mc. BGY is using the Monitone system in Sept. QST. ZZK has moved to a new house and has a 12 x 12 room instead of a 4 x 4 hole in the basement for a shack. GPH is now using the keying monitor shown in April QST. ZPB is getting on 3.85 Mc. with 50 watts to a pair of 807s. MTQ has moved to Pennsylvania. 2VDD, who has been working portable from St. Paul, now is 0MAL. ZOB, BGY, and ROE are members of the Screwball Net. ROE attended the first annual picnic of the Screwball Net, held at Chippewa Falls, Wis. GKP is using a Millen 90810 transmitter on 28, 50, and 144 Mc. It has an 829B in the final. CO has a new post-war bug. Funny thing, now Ted sends with either hand and it still sounds like tape sending. BOL is now Class A. IXR has a new Collins 32V-1 on the air. Red's Guardian Angel, IFS, is putting up a new 1/2-wave space three-element beam on 28 Mc. and will up a 1/2-wave dipole on 3.85 and 14 Mc. for him. Traffic: W0RJF 94, BGY 9, JNC 6.

(Continued on page 72)



Happy Christmas

BILL PETERSEN, WØJRY



PETERSEN RADIO COMPANY, Inc.

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DELTA DIVISION

ARKANSAS — SCM, Marshall Riggs, W5JIC — Well, A boys, some of you have been complaining about the absence of news from Arkansas. Just to be plain, I am not a magician, therefore I cannot make something out of nothing. OQS is on 28 Mc. with 807 and is getting close to WAS. OXU and OXR are new members of Boone County AEC and are on 3.5 Mc. We have lost JXO to the zero district. Sure will miss you, Doc. MRD is in the midst of completing p.p. 810 rig. He now has his Class A license. FB, Omer. JIC has been having good luck with BC-654 on 3.85-Mc. mobile. The Ozark Net has been made a traffic net and meets Monday through Friday at 7:00 P.M. LUX, Boone County EC, and JXO, Asst. EC, have announced the completion of an emergency plan for the guidance of Boone County amateurs should disaster disrupt normal channels of communication. Regular drills are held each Wednesday at 6:00 A.M. OCY is Net Control Station. Those participating so far are OCY, LUX, JXO, LQG, OXR, and OXU. Here's hoping for more news. Traffic: W5FMF 79, LUX 76, MRO 44, JIC 5.

LOUISIANA — SCM, W. J. Wilkinson, jr., W5VT — The PAM, SEC, and I are ready and willing to try and keep you fellows and girls posted on the doings around the section. CEW still is holding down the PAM job while our old reliable, KTE, is doing the honors as SEC. The RM post still is on the market. Won't some good c.w. traffic man step forward and try his hand at organization for awhile? It's a pleasant task and the experience will aid in the emergency set-up. BUK was a visitor during the month and a nice rag-chew was enjoyed along with MJT. KYK has been active on 7, 27, and 28 Mc. with a two-section W8JK beam. IRO reports he had a swell vacation in W1 Land. ADJ has been sitting in with IRO. OIJ now uses the call D4ANR in Germany. OXF is a new-comer in Shreveport. GRY is the new call of LYP. The Shreveport Club is planning a Christmas party and all members and friends will be welcome. KRX is active and will QSP. BSR, your director, is interested in the gang and wants to hear from you. K5NRA is active on 7 and 14 Mc. IOP is doing a bit of 50-Mc. stuff. FYS is on 14-Mc. c.w. AEN is a new-comer to the Delta 75 Net. EM soon will be fixed up for all the ham hands from 144 to 3.5 Mc. VT is gradually getting the summer's accumulation of cobwebs from the rig and will be pounding away in the very near future. If everyone who did not send a little dose this time will do so next month we will have a very nice report for you. Traffic: W5KYK 2, VT 2.

TENNESSEE — SCM, Ward Buhrman, W4QT — SEC: FCF, PAM: KMH, RM: FCU. The Chattanooga Amateur Radio Club provided amateur communication facilities at the Chattanooga Interstate Fair during the week of Sept. 19th. Operation was on 14-Mc. phone using the call DJI 4 and on 3.5-Mc. c.w. with the call JIH 4, with independent installations, housed in a trailer. Considerable interest was shown by Fair visitors and a good traffic total resulted. Tennessee was well represented at the Delta Division Convention, and a good time was reported by all. Our compliments to the Gulf Coast fellows for their excellent work as sponsors and hosts. FLW is active on five bands, phone and c.w. He keeps a daily schedule with HFO on 4-Mc. phone. CZL takes his portable equipment along on business trips through Louisiana and Mississippi, and makes successful contacts with his home town on 3.5-Mc. c.w. CBU is out in front on 4-Mc. phone, having chalked up a QSO with G8VB. NNJ meets several nets and has good traffic connections. DIY and HOJ are hunting bugs in their VFOs. BAQ showed up on 4-Mc. phone with a swell signal from a pair of 813s. EAL is back on 4-Mc. phone after an interval of several months devoted to operation on other bands. Traffic: W4BBT 201, JIH 4 188, ETN 79, FCU 77, BAQ 67, CZL 55, NNJ 45, EBQ 11, CBU 5, HOJ 3.

GREAT LAKES DIVISION

KENTUCKY — SCM, W. C. Alcock, W4CDA — Kentucky's three nets should be in full swing by this time. KYN reopened Oct. 1st on 3600 kc. KYP continues on 3955 kc. and KYE can be found at 145.8 Mc. MDB is new Official Bulletin Station. BAZ says more towns are needed on KYN. He is our outlet on Trunk Line "J." FQQ is on Trunk Line "M," and JCN is on Trunk Line "C." OGY is in Japan for three years. KKG works KX6AF Sundays on 14-Mc. phone and is moving to new QTH. TXC keeps phone net going on 3.5 Mc. EDV spent half of September experimenting. MRT, MSC, and AKG are working hard on 28 Mc. MSC has schedule with AEN on Thursdays. Trunk Line "C" burns JCN up with speed! At 35 w.p.m. he says! FKM is on both KYN and KYP, but because of work-hour change must give up KYP except Saturday mornings. Kentucky still is going strong on v.h.f.-u.h.f. work with Official Experimenting Stations MKJ, KKG, BPE, and FBJ turning in nice reports. FBJ and BPE tried out sixteen-element beam on expedition to Tennessee wilds and had success. They used 300 watts to 144-Mc. final. BPE is trying out 2300-Mc. cavities and 10,000-Mc. Klystrons. NNC is back at Georgia Tech. CDA gets about one wire soldered per day on rebuilding. We still need applicants

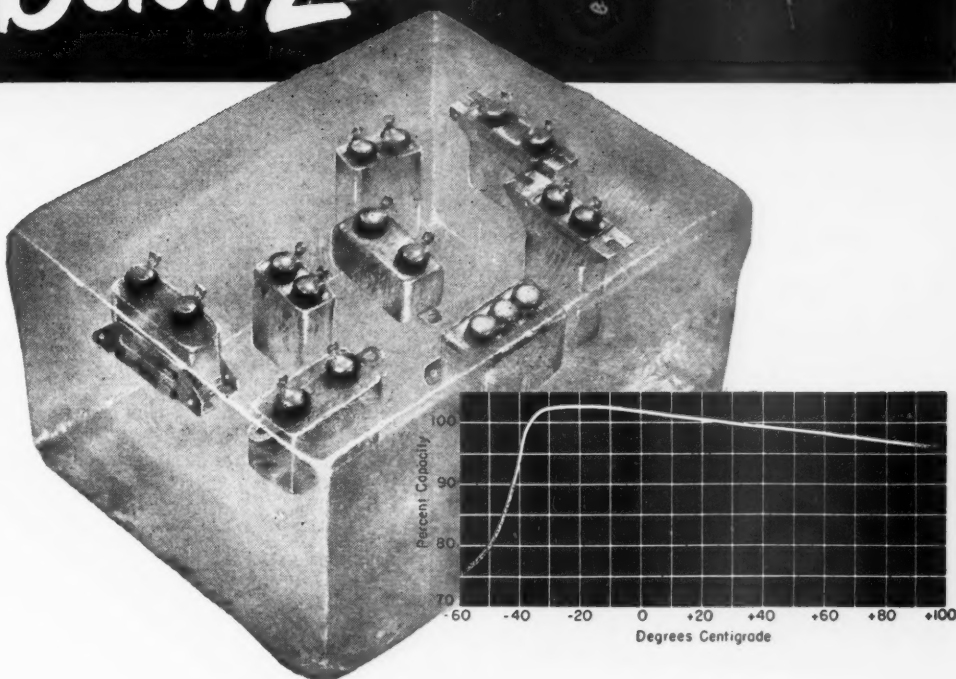
for the Emergency Corps. See your Emergency Coordinator. SCM suggests that for the sake of unity and coordinated effort clubs organize a State radio council. How about it? — Traffic: W4JCN 21, FKM 13, MSC 8, KKG 3, EDV 2.

MICHIGAN — SCM, Joseph R. Beljan, Jr., W8SCW — SEC: GJH. RMs: NOH, PVB, and UKV. All the State nets have been enjoying fine turnouts and this season promises to be the most active yet. The QMN Net meets on 3663 kc., Monday through Friday, at 5, 6, and 7 P.M.; the Buzzard's Roost Net meets on 3930 kc., Monday through Friday at 5:30 P.M.; while the Michigan Emergency Net meets on 3930 kc. Sundays at 9 A.M. The State's emergency program is progressing nicely with our SEC, GJH, doing a swell job, but Gary won't be satisfied until everyone is a member of the AEC. If you are not a member of the AEC, request information and application blanks from your SEC, SCM, or local EC. All Sweepstakes participants are requested to send me their scores, number of contacts and sections, for tabulation in the QMN Bulletin. Congrats to the Adrian Club on its affiliation with the ARRL. BHL is the new president of the Adrian Club. ARJ moved to Milwaukee. TBP is the first American to officially become a member of TL "I," which is a Canadian trunk line. BLR continues to do a nice job on the local EC Net. CYH worked all States and Canadian Provinces on 3.5 Mc. SFA is attending Oklahoma A. & M. College. OCC is QRL getting the bugs out of his speech amplifier and feed line. FX is readying a 500-watt rack job for this season's festivities. TNO is planning higher power for 3.5 and 7 Mc. with full break-in operation. CFG is building a new rig. BBK now is Class A, but still is pounding brass on 3.5 and 7 Mc. PUK has a new bandswitching 1-kw. rig. VRV reports for the Lansing gang. Lansing hams on 144 Mc. include BMH, CNC, SDB, SQL, and VRV. MTE put up a new mast for his 3.5- and 7-Mc. antenna. DPN has a new antenna and operates 3.85 and 14 Mc. PUF has a new HRO. PGG is active on 3.85 Mc. PUV has a new vertical 81K beam. WRI is pounding brass on 7 Mc. KOS has a new antenna and receiver. JUB is sporting a new three-element beam on 28 Mc. QAM will be back on the air shortly with an all-band rig. VY operates 3.85-Mc. mobile aircraft with four watts. NFF is going n.f.m. with an HT-18 into a BC-610. EYU is rebuilding. TRN makes BPL again. GSJ reports into TLAP. CJ rebuilt his ham shack. A very Merry Christmas to everyone. Traffic: (Aug.) W8URM 60, GJH 3. (Sept.) W8TRN 522, UUS 160, TBP 89, SCW 74, CYH 34, GSJ 14, MGQ 13, TQP 10, IXJ 6, UKV 6, AHV 5, URM 5, BLR 4, LHH 4, FX 3, PVB 3, CFH 3, DNM 2.

OHIO — SCM, Dr. Harold E. Stricker, W8WZ — SEC: UPB. RM: RN. PAM: PUN. Greetings from your new SCM. I have a big pair of shoes to fill and will need your help; so please get your reports to me by the 3rd of the month. The Dog House Net meets Monday at 6:00 P.M.; the Ohio Emergency Net on Thursday at 6:30 P.M.; and the Ohio River Net on Sunday at 8:00 A.M. The frequency is 3860 kc. The Ohio, Indiana, and Kentucky 28-Mc. Phone Net meets Wednesday and Saturday at 11:00 P.M. on 28,700 kc. The Buckeye Net (BN) meets Monday through Friday at 7:30 P.M. on 3730 kc. On the first official meeting on Oct. 4th, 17 stations reported. Each club EC, please tell UPB what frequency you desire for 28-Mc. mobile statewide use as it will be to our advantage to have a common frequency as we travel over the State. 29,200 and 29,650 kc. have been in use and have been recommended. On Sept. 19th the Ohio Emergency Corps called an unannounced statewide drill 12 miles north of Columbus with QQ 8 as Net Control. Results were fairly satisfactory but several of the large cities did not report in. Those who did report had a very satisfactory drill, and it is hoped that in future drills there will be more participation. The Ohio Council of Amateur Radio Clubs will meet at Columbus in December, and the clubs will be notified in advance of the subjects to be discussed. Met many Ohio hams at the Milwaukee Convention, Ohio being well represented. The Dog House Net held its last picnic of 1948 on Oct. 3rd at Serpent Mound with 29 members present. The Findlay Radio Club held its hamfest on Sept. 12th and 133 hams were present. Hal Bird, the Division Director, was the principal speaker, and spoke on "ARRL Problems." BN members in attendance discussed net problems. On Sept. 12th the Cincinnati hams (GCARA) held their hamfest. There were many displays from national manufacturers. Two members made the Brass Pounders League for "deliveries and extra delivery credits." They are GZ and FFK. WAB has two rigs; 30- and 60-watts VFO. PNY schedules KP4HU for traffic. WRN reports that v.h.f. activity during September in his vicinity was not up to par; only minor openings being present. LBH has new 28-Mc. phone rig; 200 watts to an 813. 5GWD 8 is applying for a W8 call, and has a pair of 100THs on all bands. DAE added to his postwar countries list with HL and KA. AKW schedules ZL2BN on 27- and 28-Mc. phone and has had a 100 per cent QSO with $\frac{1}{2}$ watt input. RN has new HT-18 n.f.m. exciter. 4KXH now is KOK. UW rebuilt his exciter. JFC is working 3.5-Mc. mobile. IVC is new EC. FFK and SJF now are ORS. New officers of the Central Ohio Radio Club (CORC) are NQF, pres.; ARP, vice-pres.; CSY, secy.; ZLR, treas.; NPP and

(Continued on page 74)

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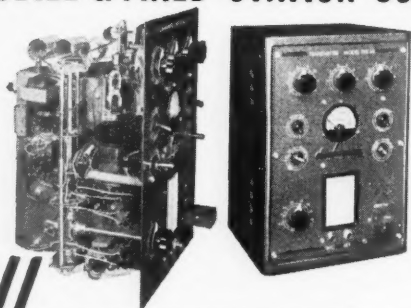
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NO PLUG-IN COILS

80, 40, 20, 15, 11, 10, 6 and 2 METERS
(Completely wired and tested — not a kit)

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LEH, directors. CNY has worked 250 miles ground wave on 28-Mc. 'phone. BYE has 66-ft. tower and three-element beam on 28 Mc. ROX has new 14-Mc. beam. PBL has new 10 over 20 beam. JHE, HWC, ABO, QQ, HAM, and ZCQ, from the Columbus area, are going good with their 28-Mc. mobile rigs. IJ has new Collins receiver. Would appreciate it very much if the various clubs would send me their bulletins. UJ and PZA have moved to W7 Land. Ohio nets have lost two good operators. Traffic: (Aug.) W8DAE 51, PUN 22, GZ 22, WAB 16, RN 8, ROX 6, CBI 5, DZO 4, AQ 2, FFK 2. (Sept.) W8FFK 271, GZ 158, HOX 55, RN 39, UPB 30, EBJ 26, SJF 24, PR 20, PUN 19, PNY 9, DAE 9, BEW 7, WAB 5, WZ 4, ZAU 3, UW 2.

HUDSON DIVISION

NEW YORK CITY AND LONG ISLAND — SCM, Charles Ham, jr., W2KDC — The big news from the AEC of Nassau is the appointment of new Coordinators in accordance with the new community breakdown plan. These include ANN, KTF, GOP, OXM, TUK, DUS, YKM, JND, BTA, and JXP. These and all other community ECs are requested to send their monthly reports to the former County EC; FI in the case of Nassau. In Suffolk, OQI is off to college in Florida and CJZ, ADW, and probably UGH will be named community ECs as in Nassau. In Manhattan, WHB reports 25 AEC members with 5 active on 144 Mc. and 15 on 28 Mc. JXH, Assistant EC for 28 Mc., holds regular weekly drills but has difficulty finding a time to please all, TVLs included. On 3.5-Mc. c.w., group I is on 3.5 Mc. Wednesdays at 2000. Group II is on Tuesdays same time and frequency. Group III, in Suffolk, will announce time and frequency shortly. All new stations interested, QNI during the drill. The fall AEC picnic at Bethpage was the best ever with about 30 of the gang on hand, with plenty of children, chow, and chatter. PF finally is home for a few months. ZBK, a new ham in Brooklyn, was tutored by brother LRR to get his ticket. RTZ left town for a few days and VNJ filled in and made BPL on California State Fair traffic. Hope is going to Florida for about six months. Best wishes to LWB, who is in the hospital, having lost six ribs. YDG is seeking ORS appointment. Jack has much trouble with local twin hams who have more pull than he with apartment house antennas. VSU is active in ESN and also plays chess with UVV, 1QJB, and 1FES and all are welcome on 7120 kc. Tuesdays at 1930. The Andrew Jackson High School Radio Club now is affiliated with ARRL. YHB, YCY, and VRC are officers of the club. HDL is trustee. The rig is a pair of 24Gs. KV4AF 2 has been off so long he blew the power supply on first contact. VAF went to the Hudson Division Convention with KTF, TUK, and QBS. The latter two are at Brooklyn Poly, as is PRE. MZB is building a new shack in the cellar and has been issued Naval Reserve call N3CRM. EYS worked one Frenchman. OBU, the section Route Manager, is looking for new blood in the NYC-LI Net. George generally can be found on 3710 or 3600 kc. ZBS is a new ham in Bayside but probably will return to R.P.I. URX was bitten by the traffic bug and is seeking ORS appointment. JZX has been operating K2UN regularly and she also has handled traffic from them at home station. OUT is active on SSN where he is Trunk Line station. EC is resuming TLAP, which is gradually picking up speed. QBS is NCS for the NYC-LI Net, which is now known as "NLI." TUK ditto on Thursday. BO still is a night owl. VOS is struggling with antennas. KDC has 80-ampere 3-phase generator in the car for mobile operation. BSP still is in Palestine installing United Nations ham station. Traffic: W2VNJ 233, OUT 186, RTZ 142, VSU 105, OBU 103, VOS 91, TUK 75, PRE 68, BO 54, URX 32, QBS 22, EC 13, VAF 7.

NORTHERN NEW JERSEY — SCM, Thomas J. Lydon, W2ANW — The N. N. J. C.W. Net, 3630 kc., meets at 7 P.M. daily except Sunday. The 40 Meter Net, 7070 kc., meets at 7:30 P.M. Monday, Wednesday, and Friday. A new net, for the benefit of those who cannot make either of the above nets, meets at 9 P.M. on 3630 kc. The net call is JN. The N. J. 75 Meter Emergency 'Phone Net held its first annual picnic at Washington Crossing State Park on Sunday, Oct. 10th. The AEC Nets sponsored by the Raritan Valley Radio Club function each Sunday on 147.3 Mc. at 9:30 A.M. and on 3530 kc. at 9 A.M. EWZ, formerly 5EWZ, now is on 7 and 14 Mc. looking for traffic. PPH has rebuilt the entire station. NCY has installed a 30-watt 28-Mc. transmitter in his car and is working all his old friends while on vacation. OUS worked EJV/PK3 on 28 Mc. with 20 watts input. NKD has been appointed RM of the new 7-Mc. net. RVRC has programmed ARRL Training Aids movies in conjunction with its training plans for new amateurs. New EC appointments: HNY for Plainfield, and PPH for Toms River. CFB has kilowatt rig on 3.5-Mc. band. MJC is very active on SSTL and NCS two nights a week. KMK keeps 'phone schedule with 4MFK. K2AO reports for the first time. BLS has been working lots of DX with his new mobile rig. OXL is doing fine traffic-handling job. ZT, who holds OO appointment, has been active logging stations outside the 14-Mc. band. A special meeting of all ORS appointees will be held on January 5th.

(Continued on page 76)

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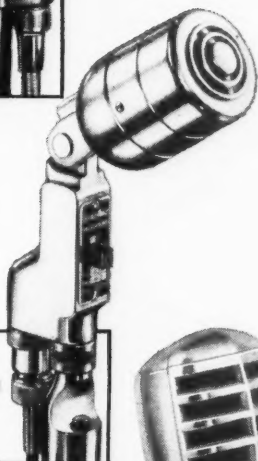
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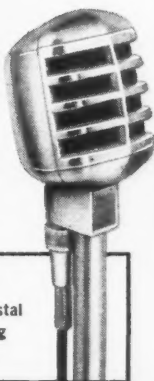
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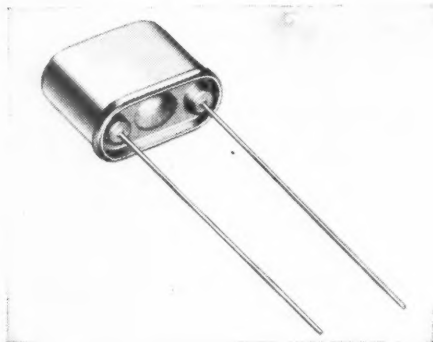
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8:30 p.m. at Red Cross Headquarters, 644 Salem Ave., Elizabeth. All ORS and prospective ORS are invited to attend. ZT schedules 0BES twice daily, at noon and midnight. Traffic: W2LFR 293, CGG 194, NKD 105, ANW 80, MTV 38, OXL 35, BZJ 22, NCY 16, CQB 15, CJX 12, PPH 11, KMK 10, BRC 9, K2AO 7, W2DRA 6, MJC 4, CFB 3.

MIDWEST DIVISION

IOWA—SCM, William G. Davis, W0PP—The Tall Corn Net got off to a flying start Sept. 13th. The Net has 25 active members and needs outlets at Iowa City, Clinton, Dubuque, and Ottumwa. Contact them on 3560 kc. at 6:45 p.m. Mon. through Fri. The Iowa 75 Net picnic was a great success, with 42 attending from all parts of the State. RHT flew down from Minneapolis to attend. The Cedar Rapids gang came over with ten cars, all equipped with 28-Mc. mobile. CVU and several of the boys gave a swell program of music, with vocals by SWI and Mrs. SQF. AUL, QVA, and FUB are sharing the NCS duties of the Tall Corn Net. FDL is new ORS. CEE renewed EC appointment. HMM renewed RM appointment. SRR is new EC. LBF and AOH furnished communications from headquarters tent to temporary air strip at the Iowa Soil Conservation Field Day Sept. 9th. HMM is manager of T. L. "L." FDL reports several new countries on 28 Mc. HCH is building new VFO around the Clapp circuit. BAL is getting set with a new beam and 50-ft. tower for 28 Mc. CK is building new garage. HKN has joined the Air Corps. NMA reports from the Davenport area. CNK reports from Ft. Dodge. PP is all set for Wichita. Thanks for the reports, fellows. It was much better and makes it a pleasure to write up the report when I know you are back of me. With the nets all activated things point to a very active '48-'49 season, so keep me posted that I may do you all justice in my reports. Traffic: W0HMM 367, FP 33, AUL 30, PP 22, QVA 16, SEE 10.

KANSAS—SCM, Alvin B. Unruh, W0AWP—This will be your last report from this SCM. Because of the press of work it has not been possible to be a candidate for re-election. The wonderful cooperation of Kansas amateurs during the past eight years will not be quickly forgotten. An earnest effort will be made to continue contact with all via signals from AWP. We regret to have to report the sudden death on Oct. 7th of Father Romuald Fox, ESL, professor at St. Benedict's College in Atchison. Before joining St. Benedict's staff, Father Fox taught at the University of Kansas and Notre Dame, and served the Army in radio service and laboratory work. ESL was loved by amateurs from coast to coast. He was a member of the Kansas Phone Net and active as an Emergency Co-ordinator. The QKS Net meets Mondays, Wednesdays, and Fridays on 3610 kc. Here is a chance to aid your community and receive code practice while doing it. AHA, OUV, EPX, FDJ, and others inquire about the QKS Net. BQJ is doing some rebuilding, with p.p. 812s modulated with 811s. EPX is back with 28-Mc. rig and 3.5-Mc. station. PNN and OOT represent Kansas City on the QKS Net. RHB is radio technician with Boeing-Wichita. Traffic: WAHA 24.

MISSOURI—SCM, Ben H. Wendt, W0ICD—Cooler weather has brought renewed interest to the two main nets of the section. The Missouri Emergency Net, 3905 kc., has grown to 65 members. MON, the old stand-by c.w. net, is again in full swing on 3755 kc. It follows that the AEC also is on the increase in membership. If you have not as yet connected yourself with an emergency group, do so at once and get in on the biggest thing in ham radio. The Missouri School of Mines Radio Club has organized and selected GXT as president, JHD as vice-president, and VMO as station manager. CLT will be heard with a KH6 call and he hopes to make it permanent. QXO has a new 600 watt, Miller exciter driving a pair of HK54s, operating all bands from 3.5 to 28 Mc. The University of Missouri Radio Club has been organized with JHH as president, JSR as vice-president, SKA as secretary, and GSB as treasurer. The club has a BC-610 at its disposal. The National Convention in Milwaukee was attended by DEA, GEP, SKA, ZXX, JHH, RMF, IZC, ICP, and YKB. The Southwest Missouri Amateur Radio Club staged a successful ham picnic. Many out-of-town guests were present to help put the get-together over. NHH is rebuilding with double the power for 3.5 Mc. WAP is constructing a Clapp oscillator circuit for his 3.5-Mc. rig. GKT has a portable rig consisting of a 20-watt r.f. section and an HQ-129X receiver. KVS is operating 7.15 Mc. with a 458A and an NC-57. QMF is constructing mobile gear for 3.85 Mc. ARH is using 110 watts on n.f.m. Traffic: W0GEP 136, QXO 94, WAP 75, OUD 16, GKT 10, SKA 6, DEA 4, ICD 4, OMG 4, ARH 2, INK 2, EEE 1, QMF 1.

NEBRASKA—SCM, William T. Gemmer, W0RQK—The Nebraska C.W. Net opened up on 3745 kc. at 7 p.m. CST with FQB, HYR, KJP, KON, LJO, OZC, PDH, SAL, and TDQ answering FAM's net call. KJP and KON are new net members. TQD renewed ORS appointment. PREPARE for EMERGENCIES, JOIN the EC. Inquire at MLB, Kearney. FAM spent the summer rebuilding to a Surplus VFO TZ40 buffer, and two "old 852s in push-pull." LRF, OZC, ZTE, LJO, and HYR started a mobile 3.85-Mc.

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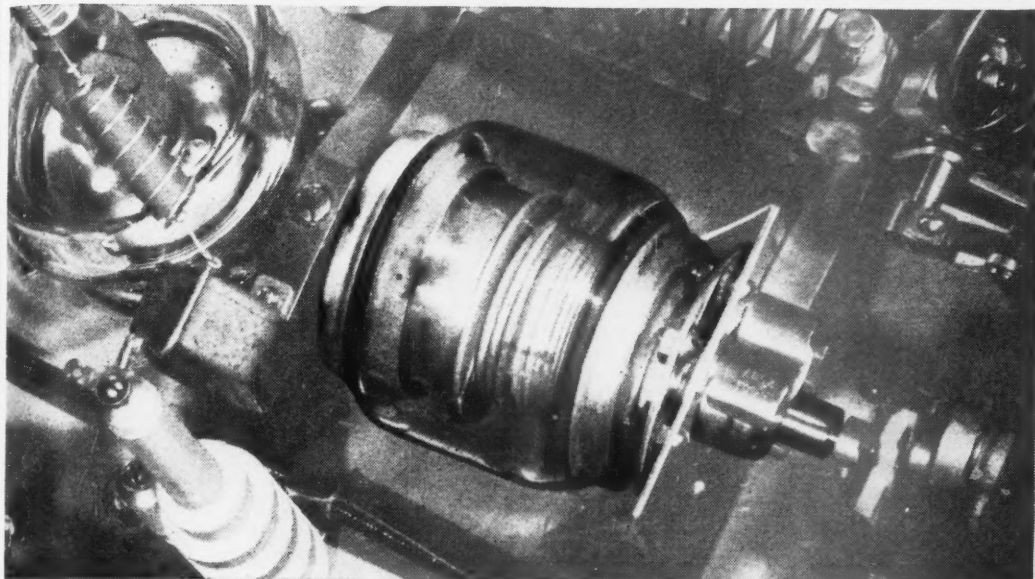
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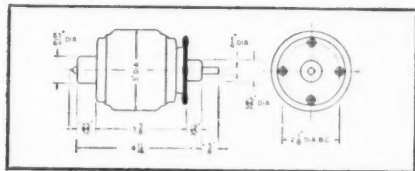
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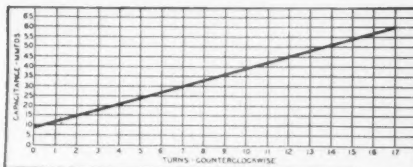
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Split-stator	5-30 mmf.	40-KV	40 amp.
VVC4-60-20			
Parallel	40-240 mmf.	20-KV	160 amp.
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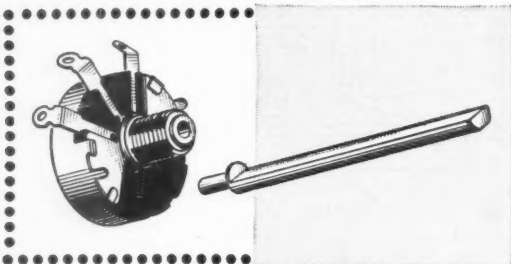


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caravan at Wahoo, with destination the Ak-Sar-Ben Radio Club picnic on the Storz farm, Omaha. ILS, LYZ, and LJO represented the Hastings gang. FQB says the Omaha 28-Mc. gang is going all out for the Quad antenna. K0USA was operated by the Ak-Sar-Ben Radio Club at the Midwest Electrical Show. The ARC now meets on the fourth Friday of the month. FQB conducts a beginners' code class on 27 Mc. Monday, Wednesday, and Friday. BVR is attending Hastings College with 28-Mc. rig. LYZ is on 7 Mc. with BC-457. BRO is using 5-watt VFO on 7 Mc. LZO has his WAS and WAC coupons. ZTE and WVE operated 3.85-Mc. walkie-talkie at the State Fair. VMP and VEC gave CME moral support while VXM recorded it on wire. JPI has new three-element 28-Mc. beam. Messrs. Handy and Collett spoke before the SENRC at Auburn. FHA is on 28-Mc. 'phone with 35 watts. EKP is on 14 Mc. with 137-ft. center-fed Zepp. CMO has new HQ-129X and OHK has a new NC-173. EXP put up 4-Mc. amphenol dipole. DNW is experimenting with f.m. on 4-Mc. 'phone using 274. RQK installed negative peak clipper.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Walter L. Glover, W1VB—QMI has new final with 250 watts on 3.5 Mc. and 500 on other bands. IKE has new job as assistant secretary at ARRL. 2MHW/1 is still waiting for new call, but expects to be set up in new QTH in Newington shortly with 500 watts on all bands and 250 on 50 and 144 Mc. QVF also reports a new final with a kw. on all bands. Looks like there will be a hole in the ether around Hartford. AW assisted in the Florida hurricane emergency. DWP has his three-element 14-Mc. beam working at last. KUO has changed his school schedule so has more time on the air. PEN is new president of the CQ Radio Club. EFW is busy with CAP. TD transmits OBS schedules on 144 Mc. GC renewed his OPS and ORS appointments. DJC and MHF also attended the National Convention. IYI attended the New Hampshire Hamfest. EDL is recovering from an operation. OAX, MHF, and QJG got married recently. KHM is going mobile on 28 Mc. The Mattabuck Club now is affiliated with ARRL. NYC applied for OBS appointment. After an absence of 22 years, old-timer AOS is back with the same call and expects to be active on all bands. QNV is new ORS, and has 450 watts on 3.5 Mc. BM has new HRO and Collins transmitter. New officers of the NHARA are: DDP, pres.; CUX, vice-pres.; ATH, secy.; JQK, treas.; FMV, KQY, and SJ, directors. New officers of the HCARA are: DAV, pres.; PTS, vice-pres.; RFG, treas.; OFU, secy.; CGD, activities director; EMF, emergency director and trustee. From here it sounded as if the Connecticut QSO Party was a huge success. The Nutmeg Net started the season on Sept. 13th with ORP, LKF, DAV, ADW, and VB Net Control Stations Mon. through Fri., respectively. 2MIRU paid VB a visit. Your SCM did a short stretch in the hospital recently, which accounts for correspondence, etc., being in arrears. Traffic: W1AW 197, NJM 137, QVF 92, BIH 79, OS 50, EFW 42, QMI 39, ADW 25, HYF 16, ORP 15, IKE 9, DWP 3, AH1.

MAINE—SCM, F. Norman Davis, W1GKJ—LNI is your SEC. If you are interested in being the EC for your community, write to the SEC and let him know about it. NXX is your RM. If you are interested in handling traffic on c.w. get in touch with the RM or call in on the Pine Tree Net at 7 p.m. on 3547 kc. FBJ is your PAM. If your operating time is spent on 'phone mostly, call in on the Sea Gull Net at 5 p.m. on 3960 kc. and meet a lot of the Maine boys. More towns need representation in both nets to give us quicker delivery of incoming traffic. AQL and LKP have renewed their OBS appointments. AMR has renewed his OPS appointment and is operating on 28-Mc. 'phone because his 3.85-Mc. antenna is down. EFR visited several hams in the Boston area while on his vacation. Several of the Maine gang attended the convention at Concord, N. H., but none were seen lugging home any prizes. 2SQC has returned to Maine after several years in New York. He probably will be CPR again at Old Orchard Beach before long. Only four stations sent in activity reports this month; many more are needed to give Maine the Station Activities report in QST that it should have. Anyone desiring report cards may have same by dropping me a request on a postal or by message through either the PTN or SGN. Of course reports may be made on a regular postal, but report cards are handier if there is a traffic total included. Traffic: W1LKP 32, NXX 18, ROM 1.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, jr., W1ALP—AQE is the new RM for the 3.5-Mc. band and the Eastern Mass. Net has started up on 3745 kc. Anyone interested, write to AQE or to me. QZS and 4KDE/1 are new ORS. DHX is a new OBS. The following renewed appointments: ONZ and LMB as OBS; ONZ as OO Class 3-4; DDC, MF, and LBY as ECs; LBY as ORS. 4KDE/1, who is living in Watertown, is on 3.5 Mc. FVD took a trip to his home town in Ohio. Ex-1RQ now is AT and is on 28-Mc. 'phone. ROB is a new ham in Braintree. RGN, in Scituate, is on 28 Mc. Ex-1HJ now is 6BH in California. KO is located at Squantum Naval Base. RBN, in Walpole, is on 144 Mc., also PLS in Sharon and KPB in Malden. We are sorry to have to announce the death of MU. DPV and OKK are on 28 Mc. QZO, in Quincy, has a

(Continued on page 80)

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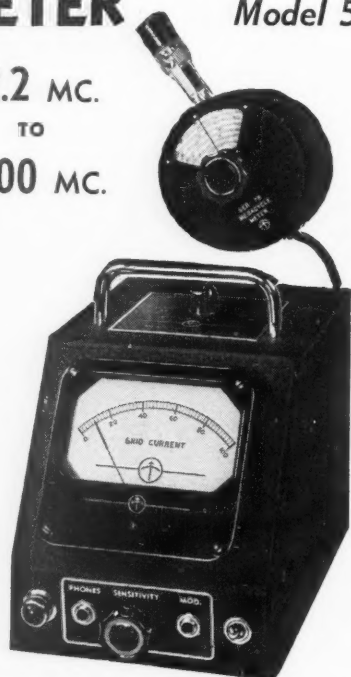
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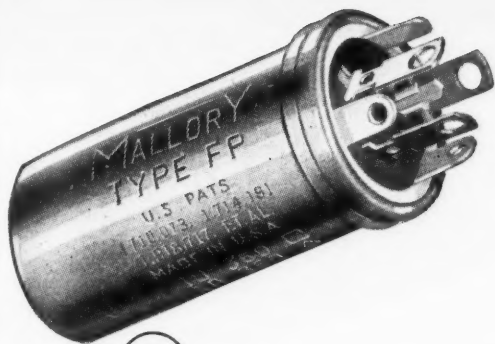
new VFO. BB, Winthrop EC, is a member of the National Emergency Net. Quite a few from this section attended the 11th Annual N. H. State ARRL Convention and Hamfest at Concord, N. H. The T-9 Radio Club held a meeting at HBG's QTH in Danvers. The South Shore Amateur Radio Club and the Brockton Amateur Radio Club held their first meetings. At the Eastern Mass. Amateur Radio Assn.'s first meeting, CTW gave an account of the National Convention at Milwaukee and ALP, NLU, HIL, and SS, candidates for New England Director, spoke. AEC, in Fairhaven, has applied for ORS appointment. WU is on ESN and SSN when home and will have a new 1-kw. rig. AF has been on 3.85 Mc. 'phone with SCR-284A and worked Mississippi for his 29th state. AVY, in New Bedford, is on most of our bands with a 150B, HQ-129X receiver, and VHF-152 converter. HUV has moved to Tucson, Ariz. LBY has a 5-element beam and 832A final on 144 and 220 Mc. EHT is on 51 and 14 Mc. Look for FL/V02FL on 14 and 28 Mc. AYI is on 144 Mc. QJB is playing chess with 2UUV and 2VSU. AAL has two operating positions. BB has a winchcharger and keeps emergency batteries charged at all times. KTU is on 144 Mc. with 522 and "J" antenna. WS has moved to New Hampshire. AY has moved to Los Angeles. BW is living in Duxbury. DWO has new antenna for 7 Mc. RBK is keeping schedules. New officers of El Ray Radio Club are: PAW, pres.; BOD, vice-pres.; LNX, secy.; ILS, treas.; NXY, act. mgr.; JSM, chief eng. JCE is putting up three-element beam for 28 Mc. PAW has a BC-654 for emergency work. KNI reports a new net on 50 Mc. on Thurs. at 7:30 p.m. FUR is on 50 Mc. QNJ and QQL have EC link on 224 Mc. The Newton Emergency Net would like the gang to watch out on the last Sunday of each month from 5 to 6 p.m. with a little less QRM on 145.62 Mc. Give them a break, gang. SH is new Dedham EC. QIE is working DX with Hammarlund 4-20 on all bands. OLC's XYL has the call ROL. LMU and OOP visited VE6WS in Edmonton and K7BL in Fairbanks. OMI, with AGE at the key, is on the EMN. JYV reports into the EMN. BHD is quite active in the U. S. Coast Guard Auxiliary and has a rig on under the call QFI. Traffic: (Aug.) W1EMG 19, AAL 16. (Sept.) W1QMJ 94, TY 84, EMG 60, WU 57, QJB 40, AAL 30, LM 28, DWO 22, AGE 15, QZS 12, LMU 10, RBK 7, BB 6, MDU 4, OMI 4, LQQ 3.

WESTERN MASSACHUSETTS—SCM, Prentiss M. Bailey, W1AZW—RM: BVR, SEC; UD: PAM: NY. BVR attended the ARRL Building Committee meeting and the National Convention in Milwaukee. NY spent two solid weeks of loading at resorts on the Cape. EOB has new Clapp oscillator and complete bandswitching with broad-tuned doubler stages. IJT is full-fledged member of SSN. CCH has new beam 60 feet in the air. The Hampden County Radio Club became affiliated with ARRL. JYH handled traffic from Japan along with getting a few new countries. New officers of the Worcester County Radio Club are EJD, pres.; QLP, vice-pres.; RLQ, secy.; LSZ, treas.; MUN, act. mgr.; and JE, publicity. PVF is a new member of WCR. KP4DU visited the club. GZ vacationed in Pennsylvania. AMI has schedules with N. M. and Ohio. RDB is busy with school and football. In between times he is experimenting with a Clapp oscillator. GSS, once 2TPS, now is on 28 Mc. IHI is active on both the c.w. and 'phone nets. JE still is swinging the Swing Shift Net with plenty of traffic. The Wachusett Amateur Radio Club meets Monday, Wednesday, and Friday weekly! They have 35 active members—25 with tickets. IBZ has moved to new QTH. COI momentarily spurns radio for golf. He has a Harvey UHX-10 for sale. GVJ has moved to Hatfield. BDV has gone remote control again with the coming of cool WX. IJT soon will be ORS. JLT will soon be in his new home. The Pittsfield Radio Club has purchased several necessary articles for emergency communications. HAZ is active on 28 Mc. and ties in with the Western Massachusetts HF Net. Traffic: W1JE 186, BVR 39, NY 26, AMI 23, IHI 14, GVJ 12, IBZ 9, BDV 6, AZW 5, IJT 5, JYH 3, RDB 1.

NEW HAMPSHIRE—SCM, Gilman K. Crowell, W1AOQ—Our eleventh hamfest and convention proved to be one of the best ever, with an attendance of over 375 and 11 states represented. The outstanding event of the day was the 144-Mc. treasure hunt run by CNX. After the dust had settled the four-element beam proved too much for the boys with the whip antennas. The code contest offered an excellent chance for those who wished to exhibit their skill. The set-up for this contest was very fine, thanks to IJB. The allocation of prizes was excellent with the main prize, a New Hampshire lobster, going to MC's! As usual your SCM's luck ran true to form; never has he drawn the correct number. The State in general was well represented. At the meeting the candidates for division director had a chance to give their campaign speeches. BFT now is the only Class 100 in the State. QXP is a new ham in Exeter, and with the able assistance of AXI is now on the air. CNX and APK have gone t.v. CRW wants more activity in the northern part of the State on the New Hampshire C.W. Net. Don't forget to renew your appointments. Traffic: (Aug.) W1CRW 56, QJX 12. (Sept.) W1CRW 192, QJY 20, QJX 12, AOQ 10, PFU 5, GEY 4.

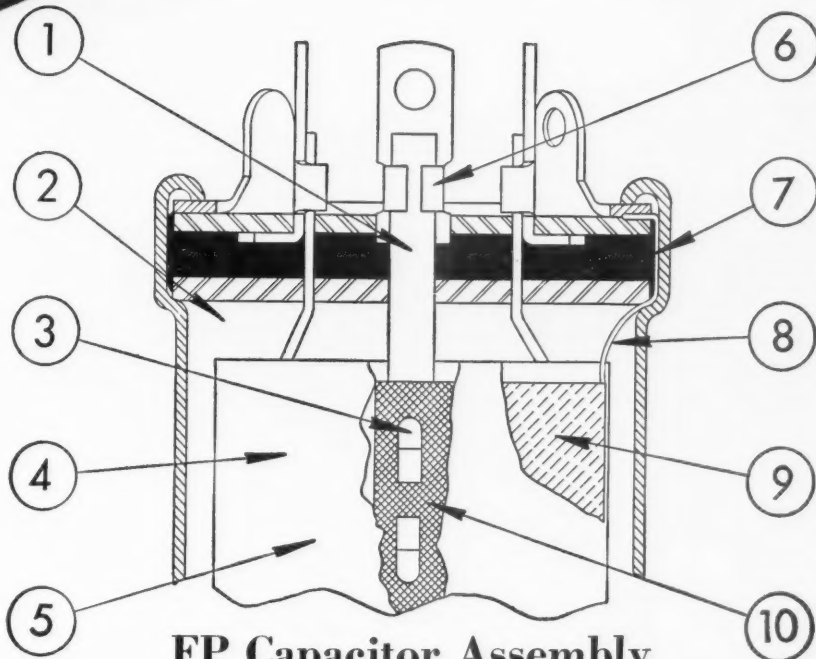
RHODE ISLAND—SCM, Roy B. Fuller, W1CJH—

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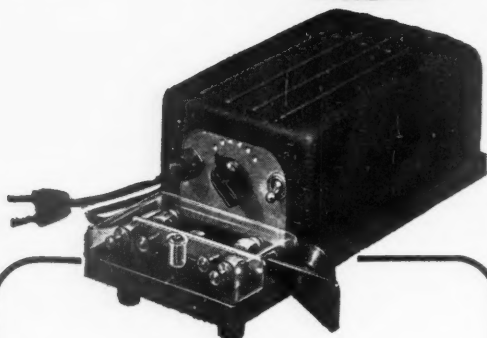
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I wish to thank the boys in this section for my election as SCM. I shall try to do the job as well as our former SCM, Clayton C. Gordon, HRC, has done for the past thirteen years. There was some activity during the September hurricane scare. ARK set up a 522 atop the Journal Building and was in contact with WPJB. The NAARO was ready with emergency power and rigs for the Red Cross and Armory.

VERMONT — SCM, Burtis W. Dean, W1NLO — RHQ is Dick Dimick of West Pawlet. ROJ is John Wallace of Alburg, brother of PDR. RPR is Paul Lauzon of Burlington. PWX, PYO, and PZX have Class A tickets. PYO has 1st-class radiotelephone license. GAE is chief engineer at WHLW. Your SCM won a VHF-152-A at the New Hampshire Hamfest in Concord Sept. 19th. FGO has joined the AEC. NLO visited QKQ and QZE. RPR is on 29-Mc. 'phone with HT-18, Atom-X and three-element beam. ORO visited NLO. LVP, MZO, OHD, PDR, PPM, PEX, QHT, ROJ, and 2KRF have resumed studies at U.V.M. PTB has joined the Naval Reserve. GKA has joined Air National Guard as radar technician. The Vt. Net operates on 3740 kc. Mon. through Sat. at 7 p.m. GKA and PSD take turns as NCS. It is a slow speed net and it would be appreciated if you fellows could get on at least one night a week. The 3.85-Mc. 'phone gang is forming a Sunday morning net. Traffic: W1PSD 24, EWF 2.

NORTHWESTERN DIVISION

ALASKA — SCM, August G. Hiebert, KL7PQ — The first annual meeting of the Norton Sound Radio Club was held in DJ's hamshack at Shaktoolik. LN and QL arrived on the scene in a Cub Super Cruiser. Also present was JS. BD, of Moses Point, was contacted by 3.85-Mc. 'phone during the meet. The Norton Sound Net operates nightly at 9:00 Bering time on 3860 kc. and is always ready to handle emergency traffic. This net is interested in co-operating with the newly-organized Alaskan Civil Air Patrol network. QL has had previous experience in that line, being the former Kansas wing communications officer of CAP. The Norton Sound meet was climaxed when the Piper Cub being flown by LN and QL made a forced landing in the Tundra a mile and a half from the end of the runway when taking off. It took the rest of the week and plenty of ham ingenuity to float the plane on two 13-ft. boats lashed together and bring it back to the landing strip.

IDAHO — SCM, Alan K. Ross, W7IWU — Twin Falls: JMX has new wide-spaced 28-Mc. beam. LNC has been working DX on 28 Mc. using an LM13 frequency meter for a converted VFO. IOA is rebuilding. MFC worked a VK on 14-Mc. c.w. with input of 15 watts. MHI and MEJ are attending college. MMO is new station on 28 and 7 Mc. KEK is building new cathode-coupled VFO. The club entertained the Northwest Division FCC manager at JMX's. Kendrick: MGL and MHR have new 100-watt VFO rig on 7 Mc. KDV is on with new 350-watt all-band rig. Nampa: New ham is MTP on 7 Mc. CQT is back on 28-Mc. 'phone and wants to contact old friends 2BEU, 8ANO, and 8JFC. Boise: New YL ham is MUT at St. Teresa's. IWU eliminated car QRM on 3.9-Mc. mobile job by using separate battery. LNC, of Moscow, paid me a visit. Drop in to see me at WU — always glad to meet you. Traffic: W7DMZ 61, EMT 27, LQN 17, IWU 11, JMH 7.

MONTANA — SCM, Fred B. Tintinger, W7EGN — The Southern Montana Amateur Radio Assn. has resumed meetings and elected the following officers: MQI, pres.; LIT, vice-pres.; FIN, secy.; Emmett Ostler, treas.; MKR sgt. at arms. The club paper, *Thumps*, is edited by KGL. New calls in Billings are KUH, MSU, MKV, MKB, MEG, MEN, LDN, MQI, and MKH. CT and KGJ are ORS and operate on T. L. "A." FTV is VFO, 14 and 28 Mc. FIN worked four VKs on 27 Mc. From Livingston, FGB says the FARM Net has returned to winter schedules and Larry takes the Montana traffic. The Old Faithful Radio Club has resumed meetings and plans an emergency program in conjunction with Western Union and Northern Pacific Ry. The N. P. Ry. has emergency power plants available. From the *Hi-Line* we learn that CBY has good results with new 28-Mc. beam. DZF is building 28-Mc. rig and GLA is working 14-Mc. DX. CAL has been working out FB from mountain top around Lewistown, using SCR-274N transmitter and receiver, plus a put-put to drive a rebashed dynamotor for filament and plate supply. HBM still is improving ART-13. JRM left for school in Billings. BXL visited FTO, HBM, and CAL. FTO acquired two BC-610 chokes for new kw. power supply. Traffic: W7EGN 63, FGB 60, CT 14.

WASHINGTON — SCM, Clifford Cavanaugh, W7ACF — SEC: GP. RM: CZY. PAM: CKT. The North Seattle Radio Club has received notice that it is now a duly affiliated society of the ARRL. FB, gang. JJK has been working both mobile and portable while on a trip to Idaho, checking in on WSN regularly. JVE has gone back to L.A. to radio school. LEC is busy building high-power c.w. rig. MTX is new ham in Puyallup Valley. The gang at the Valley radio Club, at Puyallup, are already working on plans to get a booth at the Puyallup Fair for next year. MRG is new operator at Elma. CZY, our RM, is hard at work trying to line

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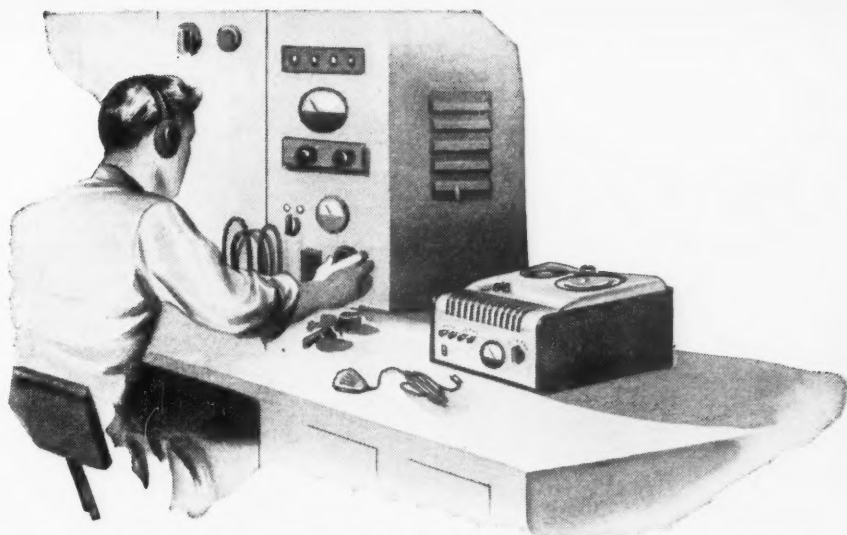
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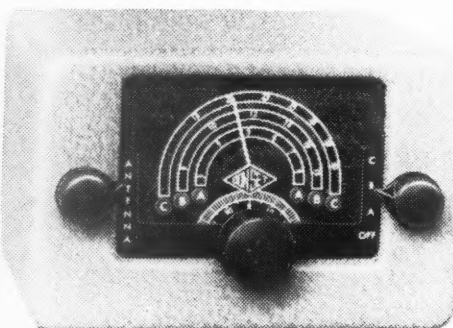


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up traffic outlets in Eastern Washington for WSNET. JC has ordered a 3.5-Mc. folded dipole. With this he intends to complete his 3.5-Mc. WAC. CKT still is high man in these parts as far as traffic goes. He must never sleep. ZU took two weeks off to visit hams in the East. APS is getting ready for the winter traffic season. DRA has a big wallop on 3.5 Mc. and collects traffic for Tacoma on WSNET. HC is back on 3.5 Mc. and 7 Mc. after a long vacation. "Cut" will be remembered as an old-time Tacoma spark man. BG reports an FB time visiting old friends at the National Hamfest in Milwaukee. CWN is busy painting his house and moving into new shack. FIX is back on the air after a long stay in the hospital and is busy getting ready to start publishing his *WSNET News Bulletin* again. MH is program-promotions mgr. at KRKO. FWD reports the war surplus pile has grown so that FWR had to move to the dining room. DMN has a big job as secretary for the combined Puget Sound Club Assn. Between blowing the big horn in a symphony orchestra and being Washington Traffic Outlet for PN and TLA, FRU is a busy man. GHI, Seattle, and SSQ, Bremerton, are new ECs and MCW and LVB are new ORS. RAO is taking on a little schooling in his old age. HWK is new WSNET member at Bellevue. The more ETO works on his rig the more natural it sounds — squeaky. (But it's a nice squeak). KWC has had his ORS and EC tickets renewed. EAU and CSK are new ECs for Centralia and Everett. LJM is building new rig. Traffic: W7CKT 2395, FRU 422, CZY 236, ACF 131, ZU 124, MCW 42, FWD 36, LEC 32, DRA 19, FIX 19, LVB 18, ETO 17, HWK 16, CWN 14, JC 12, HC 5.

PACIFIC DIVISION

NEVADA — SCM, N. Arthur Sowle, W7CX — Asst. SCM, Carroll Short, jr., 7BVZ. SEC: JU. ECs: JLV, TJY, QYK, KWZ, OPP, JYW, and KSR. DVJ is back in Las Vegas. The Boulder City Emergency Corps supplied communication for the Third Annual Lake Mead Sweepstakes on 50 and 144 Mc. OPP directed the operations, assisted by CDM, MMK, TKV, KJQ, LVS, SXD, and JU. JU has his Collins 231B overhauled and operating. The SNARC's new officers are: MBQ, pres.; TFF, vice-pres.; Jim Ingram, secy.; LBE, treas.; SXD and KWZ, act. mgrs.; and LUV, corr. secy. KJQ has a 522 and 454 converted for 28 Mc. OPP is in charge of K7NRX. BVZ has a 6C4 in the Clapp oscillator driving his BC-610. LVS and CDM are on 28 Mc. SXD and MHO are on 7-Mc. c.w. JO runs a full kw. on 7 Mc. WYV has new 129-X receiver and 4-11 rig. TJY runs nightly schedules on 50 Mc. KLK has his compact ½-kw. station completed. Traffic: W7WVZ 108, TJY 21, BVZ 1.

SANTA CLARA VALLEY — SCM, Roy E. Pinkham, W6BPT — Asst. SCM, Geoffrey Almy, 6TBK. RM: CIS. ECs: TFF, JSB. The SCCARA held its first dinner meeting of the fall season with a good attendance. Plans for the coming season include some very interesting meetings and social gatherings. The PARRA held its social get-together at Palo Alto. The club plans many FB meetings this fall under the guidance of JSB, the new president. ZZ has returned from his vacation in the East. Miles attended the National ARRL Convention and reports a very good time. JSB, now in Class A, is active on the Mission Trail Net. 3KNT, located at Sunnyvale, is new in the section. He will be on 28-Mc. mobile for about a month while waiting for his equipment to arrive from the East. ISQ is working n.f.m. on 28 Mc. but reports that a poor antenna limits him to local contacts. The Monterey Bay Club spent Labor Day on Mt. Madonna working portable rigs. WJM reports that several of the Salinas gang have worked out on BC-659s with good results. CIS enjoyed his vacation painting the house. Ken made an enjoyable trip to Vancouver, B. C., and met several VE7s. He now has his DXCC Certificate. WNI has mobile rig on 3.85 Mc. ZID is working 28 Mc. with new beam. SC is knocking off DX on 14 Mc. YMH is working 28-Mc. c.w. YQN still is tuning his 28-Mc. beam. JKN now is working 28 as well as 144 Mc. ZUJ has been transferred to Chico. Look for Bob from that QTH soon. Traffic: W6WJM 82, CIS 2, ISQ 2.

EAST BAY — SCM, Horace R. Greer, W6TI — Asst. SCM, C. P. Henry, 6EJA. SEC: OBJ. ECs: AKB, EHS, NNS, IT, IDY, QDE, ZB, and WGN. Asst. EC u.h.f.: OJU. RMs: ZM and FDR. The following East Bay section hams were seen at the Southwestern Division Convention in Los Angeles on October 2nd & 3rd: TT, DUB, PB, MEK, EY, NZ, TI, RRG, KEK, and BF. New ORS and OBS is WII of Richmond. News from the North Bay Amateur Radio Assn. shows that this club has plenty on the ball under the leadership of RRG, president. The East Bay Radio Club's paper is outstanding. For an organization that has been active for only a short time it truly is showing results. BF reports his HK57s are getting out very well. OT, the Oakland Radio Club station, is very active on the air and doing an FB job. FDR has not been feeling very well of late and might have to change his QTH. EJA reports conditions poor with a high noise level this month. YDI reports that the Mission Trail Net still is looking for more c.w. stations. 7:30 p.m. PDST, 3804 kc. QXN now is knocking off traffic in FB style after a long summer layoff. WII is getting ready

(Continued on page 86)

"PICON"

There's a short but potent sentence in the Communications Act of 1934, as amended, which reads:

The [Federal Communications] Commission, if public interest, convenience or necessity will be served thereby, subject to the limitations of this Act, shall grant to any applicant therefor a station license provided for by this Act.

Thus the fate of an application for a new broadcast station, for example, may depend entirely upon the applicant's ability to demonstrate that his proposed station will operate in the "public interest, convenience or necessity." The phrase is so often used in Washington that it is sometimes shortened to "picon."

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for some winter traffic. OJW operates on all bands. At the Southwestern Division Convention TI was presented with an FB wrist watch by the Los Angeles gang for his efforts as QSL Manager. UPV is just about through rebuilding. FXX still is the man about town and still is single. GEA hopes to become active soon. OBJ is looking for those interested in emergency work. The San Leandro, the Hayward, and the Richmond Radio Clubs are showing nice progress. The Mt. Diablo Radio Club and the SARO have not been reporting lately. No news has been received from the Mission Trail Net. AED is active again. IKQ is keeping schedules. "DON'T SHOOT TROUBLE ON YOUR TRANSMITTER WHEN TIRED OR SLEEPY." Death is a rare piece of DX that no one wants to work. Remember there are no QSLs from that faraway land. ELW spent an FB vacation in Texas. EE is on 14-Mc. 'phone. MNG has new QTH in Walnut Creek. OLL is on a trip East. ZM would like the gang to drop him a few lines once in a while. The Northern California DX Club was two years old on Oct. 10th. EY has a BC-474 emergency rig. The East Bay section wishes to extend its best wishes to A. L. Budlong and wish him all the success in the world on his new job. Traffic: W6FDR 234, OT 152, QXN 90, YDI 84, BF 16, TI 10, WII 4, EJA 2.

SAN FRANCISCO — SCM, Samuel C. Van Liew, W6NL — Phone JU 7-6457. SEC: DOT. CEC: BVS. WHL has returned from vacation in Nebraska and again is to be found pounding brass on 7 Mc. JWF has been working hard to get 3.85-Mc. mobile rig going. MBG has installed a TCS receiver and transmitter in his car and can boast of a 400-mile contact already on an experimental whip antenna. Many of the gang have been trying out 3.85-Mc. mobile gear and it proves to be very reliable for mobile work. From the Eureka area, CWR has been trying a whip antenna for receiving with fine results while BOT has been concentrating on beam antenna construction. NAO took a vacation from hamming during the summer days. SLX is using surplus gear. 9FIV is visiting in San Francisco. Another new-comer here is DQY, ex-3AE, 3BWJ, 2CPZ. Norman was at one time SCM of Southern New Jersey. He is working 50 Mc. at present with 18 states to date from his present location in Fairfax. He expects to be working schedules with the Eastern States on the lower frequencies this fall. From the Marin area, two new calls have been reported. EAX will be found on 28-Mc. 'phone. IXQ, ex-2IXQ, is chief engineer for KDFC/f.m. on Mt. Beacon, Marin County. GFW has been seen back in Marin County this past month. LUM spent his vacation in Northern California but was on hand for the Dipsea Race, Sept. 12th. MHZ has been overhauling his rig. OEI is busy moving to a new location. ZXD now has a new location in San Leandro. DNY worked G2PV, also ZL, KL7, KH6, and 16 states in three days on 7-Mc. c.w. and now has the DX fever. KNZ has been practicing with the "bug" lately and is thinking of going to c.w. again. MQQ is busy building a new home. GPB warmed up the rig again for the Dipsea Race. From the Hamilton Field gang: ZOE, the Hamilton Field Club station, has been getting fine reports from its new four-element beam on 28-Mc. 'phone. The club members report 50-Mc. signals are very scarce these days. They expect to have a 152A for 144 Mc. soon. Their HT-9 is ready for 3.85-Mc. 'phone and was used in the Dipsea race. PPL is getting out well with his new beam. TEL is building 14- and 28-Mc. beam. OZU is moving to Novato to give KD a little QRM. BCC spent a thirty-day vacation in Washington, D. C. DIX is using a BC-459 VFO, and says it sure helps on working DX. His latest are OQ5, TG9, VP1, VP3, OZ5, and F8 on 14-Mc. c.w. He still needs Europe for WAC on 7 Mc. Stand by for a raffle at Hamilton Field soon. We understand there already is a basement full of assorted prizes. The San Francisco Radio Club held its monthly meeting Sept. 24th. The speaker of the evening was Mr. Oliver Wright, A.T. & T. Engineer, who spoke on "antennas." He also gave a demonstration of the effects of varying antenna length, matching impedance, and standing waves on a feed line. The picnic held at Flood Park Sept. 11th by the Electronics Division of the Hunters Point Naval Shipyard was sponsored by the S. F. Naval Shipyard Radio Club. The Marin Radio Club meeting was held Oct. 8th at the College of Marin, Room 50, Engineering Bldg. The speaker of the evening was Mr. O. G. Villard, jr., QYT, Stanford Engineering Dept. His topic was "New Developments in Single Sideband Transmission and Reception." Traffic: W6NL 143, JWF 53, BVS 36, WHL 11.

SACRAMENTO VALLEY — Acting SCM, Ronald G. Martin, W6ZF — Asst. SCM, Ray Jensen, 6REB. SECs: KME and BVK. RM: REB. OES: PIV. Our star traffic man this month is REB with 2443 messages handled! PIV handled lots of California Fair traffic and experimented with f.m. phase modulation on 144 Mc. AIS moved from the East Bay to Sacramento Valley section. IY has moved from Dixon to 1015 Hollister St., Woodland. WSL, pres. of SARC, shortly will leave for KH6 Land. WRD is new president of SARC. AK reports the Mt. Shasta Hamfest, held at Mt. Shasta City in mid-September, was a huge success. OMR now is in new QTH at Red Bluff. 7ILJ/6 is rebuilding exciter unit but gets on at BCI's station occasionally. MIW has gone back to 144 Mc. BTY helped handle California Fair traffic on 28 Mc. JDN is new ORS and EC at Dunsmuir, and

(Continued on page 88)

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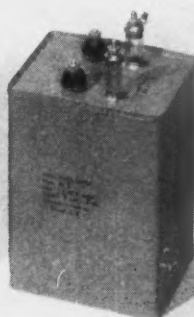
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is using 813 in final on 14 Mc. most of the time. Thanks to MIW, WSI, WRD, GZY, QYQ, VKM, and others who made the Exhibit such a huge success. ZF handled a small bit of fair traffic with strings of 50 to 100 messages at a time to 7CKT in the northwest, with consistent point-to-point circuit results. AP is busy with his share of 28-Mc. DX. GUV says that activities are on the increase. CQK has FB mobile installation. AUO is active on 144 Mc. along with BLP. KME reports attendance on the emergency net on Thursday nights is beginning to pick up. The new QTH of your Acting SCM is 2638 Thirteenth St., Sacramento 14, Calif. Traffic: W6REB 2443, JN 1627, PIV 822, ZF 531.

PHILIPPINES — Acting SCM, Craig B. Kennedy, KA1CB. The following report was written up by KA1AI/W7JKJ. Philippine amateurs are prohibited communications with foreign countries, with the exception of the United States of America, its possessions and occupied territories, and with stations in other foreign countries operated by or with the approval of U. S. Military Authorities in these zones. Almost nightly the following stations may be heard on 14-Mc. 'phone: AI, CD, AF, RP, VVS, FH, USA, ABX. On c.w.: AK, FS, AF, FT. AD is on a visit to U. S. A.

SAN JOAQUIN VALLEY — SCM, Ted R. Souza, W6FKL — Asst. SCM, James F. Wakefield, 6PSQ. SEC: JPS. ECs: KUT, PHL. OHT has a new QTH and new shack and reports the following: CTK and CTM are new stations in Tulare; MOU, who teaches at Tulare High, is on 3.85 and 28 Mc.; KFJ is building rig for 3.85 Mc., and GUZ is building for 28 Mc.; JAC, in Dinuba, is on 3.85 Mc.; NIG and DCP are working plenty of DX on 28 Mc.; ZQS is busy on 7 Mc. The following comes from the SARC publication, *Flysheet*: VKR is doing lots of work on 3.85 Mc.; ILH is planning a super-duper antenna for 28 Mc.; VKD finally made WAS; GJO has his 14-Mc. beam really working now; DVI is putting his beam into shape; YEX is back in town; BHI works traffic in his spare time; WHO and PNM are busy on 28 Mc.; HIP is getting up steam for DX; ZJO joined the Army; SYR is back on the air again; CPT has been having oscillator trouble; DBH is active on 3.5 Mc.; QUE is back on 7 Mc. The following from the Fresno area attended the Southwest Division Convention: PSQ, JPU, TFH, BWK, MGN, HKV, SJS, BLU and his XYL, BRU. INP and his XYL, PJF, from Stockton, also attended. PSQ and JPU won the 144-Mc. hunt. KUT was coordinator for the Army television display at the Fresno County Fair. SRU has new QTH. While on a hunting trip, OHB kept daily schedules with PHL and handled traffic for a number of hunters in the area. FYM reports the Turlock Club again is active. FKL has new stand-by transmitter and receiver. Remember everyone, all appointments are still open. Traffic: W6FYM 171, BHI 123.

ROANOKE DIVISION

NORTH CAROLINA — SCM, W. J. Wortman, W4CYB — The boys down around Kinston have organized a club known as the Kinston Amateur Radio Society. KLZ heads the organization with FXU as secretary and OBD as trustee. The club has applied for a club call, and conducts a code class of nine. KJS, our SEC, tells us that one group really has a swell set-up for emergency work, viz., the Elizabeth City gang. JPY is EC for the area and is doing a swell job organizing. The Key and Mike Club over Winston way plans to sponsor a 144-Mc. project. The North Carolina Net is functioning smoothly on 3605 kc. nightly except Saturday and Sunday. The 'Phone Net operates similarly on 3865 kc. All interested are invited to drop in. HDO, an old South Carolina ham, now is engineering WADE over in Wadesboro and is on 3.85-Mc. 'phone mostly. QO is having lots of fun with a 616 on 7 Mc. MPF is handling traffic and working DX on 3.5 Mc., to wit, FA8BG, VP2AD, and G8JR. The Charlotte Amateur Radio Club had a nice display at the Southern States Fair. CFL is managing the southern end of T.L. "C," covering everything from Maryland through Florida, including the District of Columbia. Traffic can be routed through this net via the North Carolina Net almost anywhere. Clubs are asked to send in news and to designate some member for EC appointment. New OBS certificates are available to OBS who signify interest by sending in for reappointment. Traffic: W4CFL 159, IMH 76, KJS 44, MPF 25, JPY 15.

SOUTH CAROLINA — SCM, Ted Ferguson, W4BQE/ANG — OPH is a new ham in the Columbia area. New officers of the Palmetto Amateur Radio Club, Inc., are HEV, pres.; BZX, vice-pres.; LJJ, secy.-treas.; and MJT, EC. Anyone who did not attend the Greenville Club 'Fest really missed a good one. To the secretary of the Charleston Club, I say thanks for the report from Charleston. ANK and CZN are South Carolina stations on traffic outlet. ANK and MRJ are on Trunk Line "C." The CARC activated its emergency plan on Sept. 22nd testing emergency portable and mobile rigs. NRC is a new member of CARC and works on 3.5 and 7 Mc. The South Carolina Net began regular operations Sept. 27th. CHD has changed his QTH to Raleigh, N. C. The following can now be heard on 3525 kc.: DNR, CXE, MTW, HTR, ANK, DXF, NRC, MRJ, MSN, BIZ, CZN, IYA, DFC, and IZD. We congratulate BJE, Walterboro EC, on his FB emergency plan. Our SEC, ANK, is hard at

(Continued on page 90)

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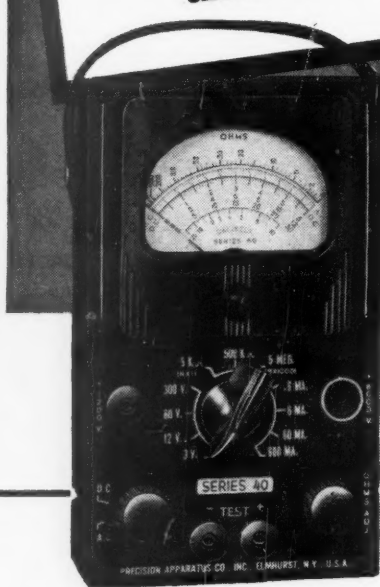
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work on the emergency set-up for the section and the emergency net on 3525 kc. You are asked to cooperate in this work. You should become a part of this group. Would like to say thanks to the Charleston Club for a dandy hamfest and a good time at the Isle of Palms on Sept. 5th. Traffic: W4ANK 69.

VIRGINIA — SCM, Victor C. Clark, W4KFC — Activity in the two Virginia nets is reported excellent by RM IA and PAM KAO. The following reported on "VN," 3680 kc., during the first five days of this season's operation: CFV, FJ, FV, IA, IPC, IPS, ITA, IYR, JAD, JDL, JFE, JRU, JVG, KDV, KFC, KPV, KVM, KYD, LPP, LRL, MIZ, MLH, MXK, NHK, NHX, NPG, NPO, NXP, and SU and on the 'phone net, 3880 kc.: CLD, CLY, CQW, FJ, FV, GBD, IKZ, IOQ, IPC, IPS, IWA, IYK, JAD, JAQ, JAR, JCV, JDB, JFU, JMX, JOS, JSR, KAK, KAO, KDV, KMS, KRX, KVM, and LKP. Drop around and identify yourself on either net and qualify to receive the FB Section Net Bulletin being put out by Assistant SCM KYD. The c.w. net meets at 7:00 p.m., Mon. through Fri., the 'phone net at 7:30 p.m. the same days plus a rag-chew session starting at 2:00 p.m. Sun. New officers for PVRC are: VE, pres.; 3JTC, vice-pres.; 3WU, secy.; 4QY, treas.; and NNN, act. mgr. The Falls Church Amateur Radio Club held an FB hamfest Oct. 16, including demonstrations of the usefulness of ham radio for the benefit of non-ham guests and participation in the National Emergency Tests. SEC KDV calls for more EC volunteers and lists the following as currently active ECs: AJA, FV, AKN, IOQ, IPC, KAO, KAV, and KYW. New appointees: FF and EMJ, both ORS. KVM is Virginia member of Trunk Line "C," with JDL as Alt. LMS lives at KYD's house. CLD will record your signal and play it back to you! VE and DHZ sent in cards for DXCC. The Ocean View Amateur Radio Club secretary, INJ, reports SCR-299 was obtained by the club on a loan basis from the Navy for emergency work. IQQ is a student at V.P.I. JZQ moved to N. C. PARC now is comfortably ensconced in FB new club building at Old Point Comfort. HPC has worked 117 locals in the Norfolk area! 5AUL/4 is a new ham in Norfolk. CC is redecorating his shack. MQM has been working 'em from aircraft QTH. KJT is being transferred to W6 Land. IPC is working on n.f.m. exciter. IQL is back on the air, having recovered from his recent marriage. A very Merry Christmas to you all! Traffic: W4CC 29, KFC 23, FV 12, VE 10, CLD 4, KJT 1.

WEST VIRGINIA — SCM, Donald B. Morris, W8JM — The MARA elected the following officers: KWI, pres.; GQE, vice-pres.; FMU, secy.; Matthews, treas.; JM, act. mgr. GBF, CSF, and OXO are doing a bang-up job as NCS for W. Va. 3770 Net. Our sympathies to DCO on the loss of his wife after a very short illness. The Parkersburg amateurs have organized a radio club and have HUG as the outlet on the West Virginia Net. OJI has new mobile 28-Mc. rig. EBG has moved to Ohio and ESQ has settled in Clarksburg. PZT has 1-kw. c.w. rig going on 3770 kc. After a long absence BOK is rebuilding for 3.5-Mc. c.w. operation. Northern West Virginia hams held their annual freeze-out party high in the Preston County Mountains with an SCR-299 being used as the transmitter on 3.5 and 7 Mc. The PAM post is opened to an interested active 'phone man. What say? Fairmont amateurs received an excellent newspaper report on their coverage of Army Air Force Day. Reports from Clarksburg hams were broadcast over WPDN, b.c. station. BTY reports work is interfering with ham radio. New amateurs are: Morgantown — 5KVM/8, BBF, ZIT, and DDF. Parkersburg — ZBO, BVQ, BWU, CLD, and BWT. Traffic: W8GBF 20, CSF 17, OXO 14, DFC 4, JM 4.

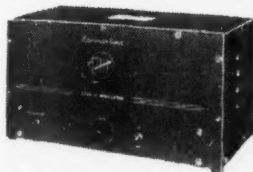
ROCKY MOUNTAIN DIVISION

COLORADO — SCM, M. W. Mitchell, W0IQZ — This being my first report as your SCM, I wish to take this opportunity to thank all those who supported me in the election. I wish to especially thank Glen Bond, QYT, your former SCM, who so willingly gave considerable time to acquaint me with the many duties of the SCM business. I would like to take this opportunity to ask all Colorado hams to send in reports early in order that they may arrive before the seventh of the month. The more cards, the better. If you need report cards, drop me a line and I promise to shoot them out immediately. I need the reports, fellows, and your help will be greatly appreciated. OEV says he has quit building his new beam because of the high prices of materials. WO developed a three-band antenna that is pretty hot on 14, 27, and 28 Mc. FDP gets out FB on 27 Mc. with 12 watts input to a pair of 6C4s. AYD is rebuilding to higher power with an 810 in the final. He plans working 14 and 28 Mc. IFF has an FB rig going on 28 Mc., using an 815 in the final, built from the Handbook. It had more bugs than the law allows but considerable dousing with electronic DDT got 'em under control. I notice that quite a few appointments have lapsed and would like to hear from the holders of these lapsed appointments as to whether you would like to have them renewed.

UTAH-WYOMING — SCM, Alvin M. Phillips, W7NPU — After several months of c.w., UOM is back at the mike. BED is looking for traffic. A new 30-Mc. beam tower and a new 14-Mc. antenna about concludes the task of moving

(Continued on page 84)

HAMMARLUND Four-11 MODULATOR KIT



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BY-LINES... by

Bob Gunderson
W2JIO



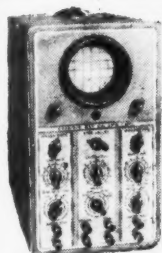
CONVERSION OF 8C696A. 459A, 458A, 457A. Remove the 50,000 ohm cathode resistor from the 1625's and replace it with 200 ohms. 10 watts. The screens and plates are brought out to separate B+ terminals. Next, relays are removed and a 12 volt ac relay keys the oscillator B plus. All terminals are brought to a 6-prong socket at the rear. Antenna circuit is modified so present loading coil can be used, or link introduced into final tank for other antenna coupling methods. Used as a VFO, plate voltages are 100-200. As a complete xmitter, oscillator voltage is 150. screens 255, and plates 600 V. When excitation is removed from: final, amplifier plate current remains high. Without excitation tubes are working class A, and power supply voltage remains fairly constant. Without voltage regulators, "TX" reports are always received here at W2JIO.

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plifier ±10% from 10 cps to 40 kc. Gray crackle cabinet 14 1/4" D, 8" W, 14 1/4" H. Shpg. wt. 30 lbs. Cat. No. A-2. \$16.90 Down—12 Months at \$5.97

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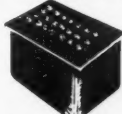
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5-859	8	2000	2.75
5-860	4	3000	3.75

High Voltage, High Current PLATE TRANSFORMER



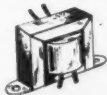
Rugged unit is ideal for medium power phone and CW xmitter. Designed to deliver 1345 volts AC, each side, CT at 500 Ma., from 110 V, 60 cycle source. Will operate for many hours without "cooking". Primary tapped for 105, 115, 125 V. 6" W x 9 1/2" L 8 1/8" H. Screw terminals on bakelite board. Inverted type mtg. Wgt. 65 lbs. No. 5-877... Special **\$14.95**

Multi-Filament Xformer



Perfect filament transformer for most medium power rigs. Used with plate xformer (above) provides basis for swell power supply. Tapped primary: 105/125 volts, 60 cycles. 6 separate secondaries: 3 windings 6.4 V @ 8 Amps., 2 windings 2.6 V @ 2.5 Amps., 1 winding 2.6 V @ 10 Amps. Will easily handle pair of 866 rectifiers plus all other tubes in Audio and RF sections of rig. Inverted flange mtg. 4 1/4 x 5 x 5 1/4" H. Wgt. 14 lbs. No. 5-880... Special **\$5.95**

6.3 V Filament Xformer



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2X2/879	.49	872A	1.75
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3CP1	.99	954	.49
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3E29	3.49	958A	.49
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5CP1*	3.75	1619	.49
10Y	.59	1625	.49
211	.69	1626	.49
285A*	.75	1665/2050	
286A*	.69		1.18
304TH	3.95	2051	.69
304TL	\$1.39	7193	.49
316A	.39	8005	4.95
331A/805	4.95	9001	.49
705A	2.95	9002	.69
801A	1.49	9003	.49
803	8.95	9004	.69
804	8.95	9006	.49
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807	1.15	6AC7	.99
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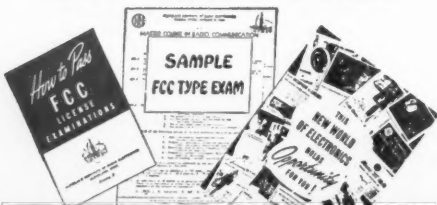
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(Continued from page 90)

TST to a new QTH. UTM is high point traffic man again and is looking for more section contacts and outlets. KIY /7 now is located at Poplar Mountain. Look for him on 3520 and 3530 kc. UTM reports 100 per cent response from the EC group in the Bountiful area. LRQ, ACG, and IDO participated in a forest fire emergency at Casper Mountain. They had a lot of sleep to catch up at the end of the emergency as watch was maintained all night for two consecutive nights. IDO reports the Shell, Wyo., Hamfest as a big success, with the following Casper gang in attendance: ACG, IDO, AMU, LKQ, and CBL. LQP is Assistant EC for the Bountiful area. Traffic: W7UTM 320, GBB 43, RPX 25, TST 16.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Dr. Arthur W. Woods, W4GJW
A — SEC: MAB, PAMs: BA and COU, RMs: DD and IMK. Twenty-one new AEC members were signed up when your SCM visited the Mobile Club. COU erected new half-wave antenna for 3.85 Mc. MNP is building new 28-Mc. rig. DTV will be transferred to KP4 Land with the Coast Guard. SLJ is working TL "C" south. MXU, MQI, and MRL have been operating the Brookley Field Club's transmitter and meet schedules with TL "J." MUW soon will have separate rigs for 3.5 and 7 Mc. DXB will try n.f.m. on 14 Mc. OCN is new in Alabama City and has a nice signal with a 459-A on 7 Mc. Three new calls have been issued in Sheffield: OGL and OFM, father and son, and OGW. CDC and CYL represent AENB and AENP in Sheffield. EVJ is back on the air using a Federal rig. KF is on 7 Mc. A Huntsville station is needed for AENB and another for AENP. Any volunteers? GJW has new Hunter Cyclometer 20 exciter. 50- and 144-Mc. activity is on the upswing and inquiries are invited from other sections. Traffic: W4COU 53, MXU 53, DXB 4.

EASTERN FLORIDA — SCM, John W. Hollister, W4FWZ — Again amateur radio in Florida has demonstrated its public service abilities. Twice within a period of two weeks, and in a precise manner, the nets went into action as a result of the two storms. A strong urge to help out and plenty of "know-how" put the jobs over. There were 131 listed stations which helped actively, and untold numbers aided by staying off the net channels. Over 2500 man hours were reported. Lots of gear went down to rise again with honors. Everybody risked tired equipment but there was a job to be done. Nice going, gang. Brooksville: MNT is on 14-Mc. 'phone. (The young certainly are full of energy these days.) Clearwater: Not every man knows his own strength. AYX and his new meter will at least know his own field. Cortez: Any glib talk from DQW is purely coincidental. It has nothing to do with his selling Florida lots. Deleon Springs: PEI says he met all the big shots at the Milwaukee Convention. Now he is sporting (a) Mill, (b) Mon-Key, (c) Boomerang. Those aren't what made Milwaukee famous. Miami: The committee on ethics had better look into the advertising slant to this OBS business. With AAR on 3.5-Mc. c.w. Miami has practically a monopoly. Too bad Orlando didn't get away with that Orange deal. The force of the storm blew BXL into that last corner for his WAS with 16 watts. Umatilla: Hang out the mat for FJZ. AYW is now Class A. (But not on 14-Mc. 'phone). West Palm Beach: The OES, FNR, says v.h.f. is dead. In small print he infers a trip to the altar. Here's good news for the traffic nets: MVJ has been upped another rung in the ladder and will at last have some free nights. LXV is Class A. Traffic: W4MNT 112, IQV 78, AAR 47, WS 37, PEI 21, DQW 15, FWZ 10, MVJ 10, LCZ 6, AYW 4, AYX 4.

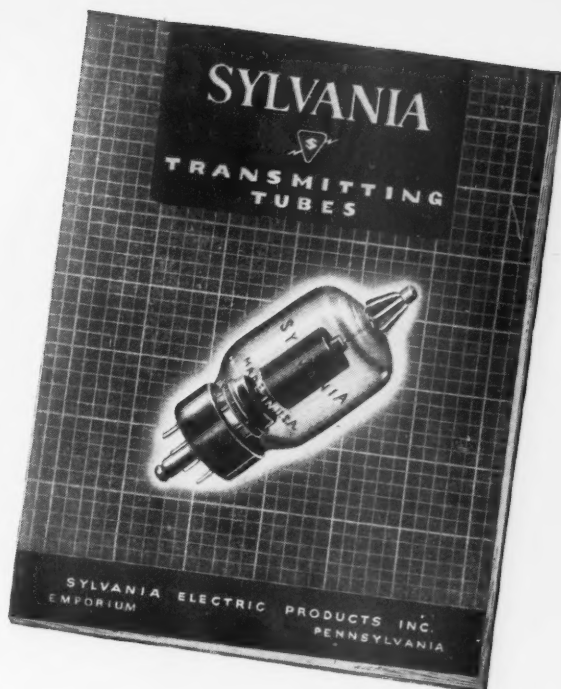
WESTERN FLORIDA — SCM, Luther M. Holt, W4DAO — AXP used emergency a.c. generator during recent power failure to maintain schedules. NGS is big DX man of the month. BGI changed QTH to "Homer Manor." NFM built 28-Mc. mobile rig. W00XX is at NATB. BJF is active on 7 Mc. after long lay off. Pensacola stations active on 7 Mc. now include EQR, CNK, MUX, NWC, DA0, NOX, and MS. HIZ is trying for two-way contact on 144 Mc. with EQR. DAO, CNK, and EQR visited the Crestview gang. MSX has been transferred. MFY is on 7 Mc. FDL moved to Evergreen. ACB has organized 3.85 Mc. emergency net for section. Ex-HQ is getting his ticket again. HJA attended the Delta Division Convention. MEN plans 7-Mc. operation to boost code speed. OCN, OCK, and ODO are new Pensacola calls. DXQ wants 14-Mc. beam. NOX plans crystal-control. JV worked portable while on active duty with Marine Reserve in Atlanta. Traffic: W4MUX 50, AXP 11, NGS 7.

GEORGIA — SCM, Clay Griffin, W4DXI — SEC: BIW. PAM: BOL. GKI won an RME-84 at the National Convention in Milwaukee. OAM is a new ham in Claxton. BOL built a workshop in his back yard. GGD has been chasing 3.5-Mc. DX. Atlanta: LNG is back on 144 Mc. after vacation up North this summer. BCR has been handling 'phone DX traffic. BIW, HDC, EFS, and DXI met with S. E. Area Red Cross officials. All ECs are urged to make themselves known to local Red Cross officials. We are announcing a Georgia QSO Party, to be held Sunday, Dec. 12th, from 2 to 4 p.m. Suggest 2 to 3 p.m. for same band cou-

(Continued on page 96)

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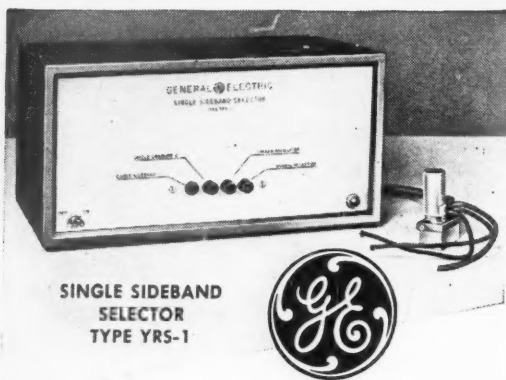
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GENERAL ELECTRIC

tacts, 3 to 4 p.m. for cross-band! (3.5 or 3.85 Mc. to 7 Mc.) Score one point for each different station worked and report your results on a card to the SCM. The Cracker Net needs more c.w. stations. Contact DXI or BOL if you are interested. GGD represents our section in TLC South. Traffic: (Aug.) W4BCR 37. (Sept.) W4DXI 18, GGD 16.

WEST INDIES—SCM, Everett Mayer, KP4KD—AM added HC1FG to his string and his XYL, HR, worked VO2CO for a new one. CO is mobile on 3.85-Mc. phone. FU and CM built 28-Mc. beams. FU wants QSO with W4GET. FP has Collins 32V1 and received WAS, RCC, WCC, and WPR25 Certificates, and keeps daily schedule with W5OKM. EZ overhauled beam. BM is up to 74 countries on 28-Mc. phone. DV is overhauling PRARC rig. DV and KD ran KP4ID (PRARC station call) portable on El Yunque. FX now is W5OXH and is en route to CE7. GJ is en route to Bahrain Island. EW is at Navy Line School in Newport. CU is up to 32Z 110C postwar and is digging hard. BJ transferred to Miami and works his OM, KD, through W4RBQ. KD still digs for DX (and KP4s). AEC nets are going strong on 3.5-Mc. c.w. and 3.85-Mc. phone. AM, DB, CK, CL, DV, HR, CB, and KD were active in installing station in Red Cross Headquarters for emergency work. Traffic: KP4EZ 25.

CANAL ZONE—SCM, Everett R. Kimmel, KZ5AW—CG is editor of new CZARA monthly bulletin. JM, CG, and others are teaching code three evenings a week on a local Panamanian broadcasting station, HOOH, the owner having donated the time to HP and KZ5 hams. FS, aided by CG, is working with CZARA code classes, while bilingual JM gets behind the instructor's key twice weekly in the Arts and Crafts School in Panama City. As the KZ5s are located on a strip of land 10 by 50 miles in the Republic of Panama, activities naturally overlap and typical ham good-neighborliness prevails. Both the local Boy Scout organization and the Canal Zone Hobby Club have requested "a typical ham station in operation" installed at their forthcoming annual events, and CZARA has agreed to supply the stations. The crop of 7-Mc. folded dipoles going up augurs well for the fall and winter traffic nets. CN, at Cocoli, is looking for calls and will answer all QSLs.

SOUTHWESTERN DIVISION

LOS ANGELES—SCM, Vincent J. Haggerty, W6IOX—Aast. SCMs, W. J. Schuch, 6CMN, and Irvin O. Hege, 6FYW. UXXN. 618 E. Buckthorne. Inglewood. ZOL schedules BFI and BYT. VRL has new VFO going on 3.5 Mc. CGO is active on 7 Mc. YSK relaxes after helping install KLAC-t.v. in three weeks. LKF has gone deer hunting in Nevada and promised the Paso Robles gang a venison barbecue when he returns. HFY is trying for WAS. PRRC had a portable display at the County Fair. AM claims 40 zones and 169 countries worked. ZQV is active on Southern Border Net and has applied for ORS appointment. NAZ schedules 2LLZ, 3CUL, KG6DE, and KG6DI. The YL Radio Club of Los Angeles sponsored a luncheon-fashion show at the Southwestern Convention. One hundred YLs and XYLs attended, including YLRL 6th District Chairman, 6PJF, of Stockton. YLs acted as hostesses at the Convention dance. NZP was a hardworking YL on the Convention committee. The YL Radio Club of Los Angeles held its September meeting at the home of NAZ with a barbecue luncheon as a feature. Congratulations to DDE on his recent marriage. Our thanks to CMN for pinch-hitting for the SCM during his vacation. RAD is NCS on the SCN. 7DLR/6 now is 6DLR and plans traffic work when his CAA duties permit. RPO is active on the high end of 7 Mc. ASW is OBS on 29 Mc. BUK reports regularly but says there is nothing new this month. IOX visited ARRL Headquarters and 1AW, but was sorry to learn of the untimely passing of K. B. Warner. CMN, DDE, and RAD made the BPL on deliveries this month. Congrats! BTA, EC for La Crescenta, sent in clippings on AEC work in his vicinity. Recently La Crescenta Valley Radio Club members demonstrated an auxiliary communication system to be used if and when a local disaster causes failure of normal communication channels. Headquarters was American Legion Hall, where 45 Legionnaires watched the proceedings. Auxiliary-powered transmitters working on 28 and 144 Mc. established contact with operators of portable and stationary equipment located throughout the valley. Stations in Burbank, Glendale, San Fernando, Pasadena, Wilmington and other cities were contacted and agreed to stand by in the simulated emergency. Sending and receiving equipment, everything from fixed ham outfits to walkie-talkie sets, reported in to the control center that they were standing by for communication work in the simulated catastrophe. The show was a duplicate of the work club members will do as a contingent of Los Angeles County Disaster Relief Authority. The club will provide its equipment for use in any disaster in which normal communications are partially or wholly cut off. Four automobiles equipped with two-way radio telephones and three privately owned 1000-watt radio stations are included in the club's communication network. BTA advised that the group soon will have two or more of the automobiles in readiness. Traffic: W6RAD 342, CMN 183, DDE 181, NAZ 70, ZQV 13, AM 8, FYW 8, ZOL 4, YSK 1.

(Continued on page 98)

QSO's from OHMITE



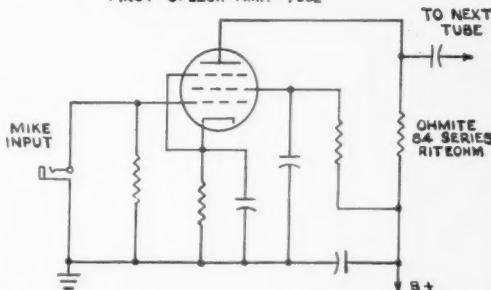
HOW TO ELIMINATE HIGH GAIN AMPLIFIER NOISE

Perhaps you have worked one of those Hams who turned the gain "wide open" on his speech amplifier and then wandered around the shack while in QSO. Perhaps you also noticed a high hiss level on his carrier.

This high hiss level was probably caused by a noisy carbon resistor in the plate circuit of the first speech amplifier tube. Turning up the gain on the

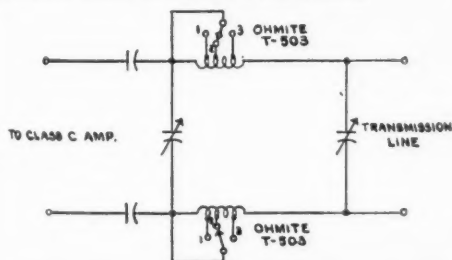
speech amplifier to boost the very low output of the microphone made this hiss noise noticeable. Replacing the plate load resistor with an Ohmite 84 Series "Riteohm" wire-wound resistance unit equal in value to the carbon unit will eliminate this source of noise.

FIRST SPEECH AMP. TUBE



CHANGING ANTENNA TUNER COIL INDUCTANCE

If you have the problem of changing the inductance of the coil in your antenna tuner, Ohmite has the answer. The Ohmite Band Switch T-503 has been especially designed for high-frequency and high-voltage applications. Each switch has three contacts so three bands may be covered. Two or more switches may be ganged for "single-knob control." For radio frequency application, the switches should be mounted on insulated supports to reduce stray capacity to ground. Shown is a Pi-section tuner using the T-503 Switch.



HAVING TROUBLE WITH NOISY POTENTIOMETERS?

How many times have you replaced the volume control on your communications receiver or the XYL's Kitchen B. C. Set in the last three years? If you want a permanent cure for this trouble, Ohmite has a composition potentiometer in which the noise level becomes less with use. These units have a molded composition element that will provide years of life and smooth operation. The potentiometers are rated at 2 watts and carried in stock in all popular resistance values with a linear taper. Clockwise and counter-clockwise log tapers are also available. See your Ohmite distributor for this rugged potentiometer, Ohmite Type AB.

Write for Bulletin 137
"Ohmite Ham Hints"



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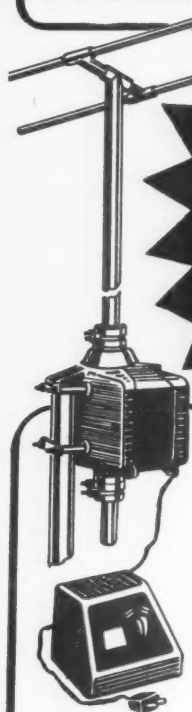
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NEW ALLIANCE "Tenna-Rotor" BEAM ROTATOR

- 360° Rotation at 1 RPM
- Remote Control
- Supports up to 25 lbs.
- Starts, Stops or Reverses at any point

Here's a perfect Beam Rotator for Amateur or Television Antenna—Priced amazingly low! Never before so many desirable features at such low cost! The "Tenna-Roto" is remotely controlled from a compact, single-knob control box. Turns a full 360° at 1 rpm and supports up to 25 lbs. Instantaneously starts, stops or reverses direction at any point—automatic stop after complete revolution indicated by light on control box. Has heavy duty motor and gear train in sturdy, light weight, waterproof housing. Antenna mast up to 1 1/2" dia. mounts in hollow shaft—firmly held by positive adjustable clamps. Transmission line can pass through mast, thus eliminating twist. Step-down transformer operates 24 volt motor from 110 V, 60 cycle source. 4-wire cable connects control box to rotator. Instructions supplied. Less Cable. Shpg. Wt. 12 lbs.

No. A16180, Amateur Net **\$23.49**



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ARIZONA — SCM, Gladden C. Elliott, W7MLL — MOA is operating portable on 28 Mc. at Kankakee, Ill. GYK has his Class A license and is on 3.85 Mc. PEY has a pair of T55s on 14 and 28 Mc. LBN ran his DX up to 32 countries. New ECs: Tucson, LLO; Phoenix, JMS; and Casa Grande, RJN. The following attended the Southwestern Division Convention: KOY, JUT, TBR, MID, OAS, GY, LHD, KWW, MHP, JFX, MWQ, JYZ, MOF, KYM, MAL, and MLL. They brought home 7 prizes. LFX has a 522 on 144 Mc. in Tucson. UPF has a full kw. on 14-Mc. c.w. and reports FB results. UOG spent his vacation with a 28-Mc. mobile rig in California. MIB is a new Tucson call. Prescott now has seven hams on the air: KQS, EAW, CFA, KYM, CMP, WKV, and UUN. LVR has a Harvey-Wells for all-band c.w. PEY worked his 100th country. KQS, in Prescott, turned in a nice job of emergency operation for the Forest Service. New officers of the Old Pueblo Club are: KWW, pres.; MPQ, vice-pres.; REA, secy. You are needed on one of the Arizona emergency-traffic nets. High-speed c.w. 3515 kc.; low-speed c.w. 3552 kc.; 3.85-Mc. 'phone, 3865 kc. The 3515-kc. Net meets at 8 p.m.; 3552 kc. Net at 7 p.m. Merry Christmas and Happy New Year everyone. Traffic: W7LPA 65.

SAN DIEGO — SCM, Irvin L. Emig, W6GC — Asst. SCMs, Gordon W. Brown, 6APG and Shelley E. Trotter, 6BAM, SEC: DUP, RM: BGF. BGF reports that the Southern Border Net is growing by leaps and bounds. New members are FMZ, 5KTE, 9KQL, 9BOL, 9YOS, 9CVQ, and 7LPA. DUP organized the Emergency Corps for the Simulated Emergency Tests. The Imperial Valley Club is again active and publishing the *Ham Gram*. While in the East during the summer, DLN used 14-Mc. 'phone for home contacts. CNQ is heard more often lately. Low-powered RDI has gone high power! UQI is heard on 3.85-Mc. 'phone, with DED and CQW on 3.5- and 7-Mc. c.w., while CNZ, BSP, and WOP stay on 7 Mc. SCQ is recovering from injuries received in an auto accident. WHW is rebuilding for 7, 14, and 28 Mc. QUS installed a neat little 3.85-Mc. 'phone in his car. DWA reports successful television signals received in the Laguna Mountains from Los Angeles stations. AWZ reports a new baby boy. EWU's son, now studying electrical engineering at Berkeley, has taken the amateur exam. BKZ received an 86-word message from 4BBT, FMZ, recently of C6 Land, now is living in San Diego. VTV returned from a 10,000-mile auto trip with 28-Mc. mobile. ZSA returned from vacation with 28-Mc. mobile. FFV bought a new test meter. YTH is installing 28-Mc. 'phone in his new red scooter. KW is running for director of the Southwestern Division. AWW reports for the San Diego YLRL. This club is starting a membership drive for YLs to study for their licenses with classes to help their theory and code. At the club's last meeting the SEC, DUP, spoke on the AEC. OBD is spending most of his time at Pt. Mugu. YTH and VCD returned from White Sands, N. M. YDK's traffic total was the section's highest! CHV has 111 countries with 98 confirmed. GC is learning to fly. Traffic: W6YDK 498, BKZ 134, BGF 133, LYF 42, WXX 38, DUP 12, CHV 6, FMZ 2.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, N. C. Settle, W5DAS/ MNL — The latest call, PAK, is issued to Luke O'Bannon, Dallas. MMX is leaving El Paso for Belen, N. Mex., and NTX loses a good traffic outlet in El Paso. HBE is finishing a new beam. ENE is hunting rare DX. The DARC is lining up its forces for the next ARRL Convention. EVI is serving as temporary chairman. CHJ threatens to get back on the air when the weather cools. AAK has a new Collins 75-A receiver and EVI has a new 310-B exciter. HHU keeps 28 Mc. plenty hot. LTP and FDI are spending more time on 3.85-Mc. 'phone. KI is too busy to spend much time on the air. Dallas hams are getting ready to work on t.v.i. GZU, of Bonham, leads NTX with traffic and makes BPL this month. CC, of Denton, sticks on 3.85-Mc. 'phone. Signs of an early and cold winter — JDZ has moved his gear into the house. Brad is active with SEC work. LDN now is in Stamford. IJC is getting his ART-13 perking. NII, of Ft. Worth, is on 7 Mc. LSN is rebuilding and is about ready for Rebel and TLAP Nets. AKM has a new beam and is working lots of DX. ASA is back on the job after an illness. NFT is busy with work that QRMs his net work. NRE keeps the locals up too late on 28 Mc. Wish the 'phone nets would make traffic reports. RG has worked some nice DX with his 28-Mc. mobile rig. DXR, CFQ, DN, and DAS have mobile rigs on 3.5 Mc. Please send in news for this column. Traffic: W5GZU 1239, CDU 67, ILZ 9, LGY 2.

OKLAHOMA — SCM, Bert Weidner, W5HXI — Asst. SCM, George Bird, 5HGC. SEC: EST, Oklahoma, among other things, now has a family of four all having their own amateur calls and stations. HXJ is the father, PAD is the daughter, PBO is the son, and PCH is the mother. The Bartlesville Club picnic at Osage State Park was attended by BBM, MQV, BMK, NCP, MRK, GOL, CED, EAK, JKS, MXB, FUU, O0Z, HGC, HBB, PA, and EST, together with their families. Four transmitters were set up to operate on 3.5, 3.85, 7, and 28 Mc., with the first contact made within twenty-one minutes after arrival on location. OCARC elected the following new officers: CKQ, pres.;

(Continued on page 108)

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Millen, Sonar, Bud, Gon-set, Silver, Premax, Workshop, Amphenol-Mims; Jensen, Meissner, Browning; I have everything.

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LOOK

35-FT. MAST KIT

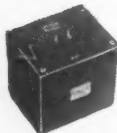


New, Signal Corps type. Kit has seven 5' 6" sections of 1 1/2" o.d. steel tubing, heavy 1/16" sidewalls, green enameled finish. One end of each tube is ferruled 6" for tight fit into next section.

An inexpensive, sturdy, portable antenna mast or vertical radiator. Easy to erect. Complete with heavy canvas carrying case with sections for each tube and wrap-around straps. 6 ft. length overall. Total weight 45 lbs. Complete,

\$9⁹⁵

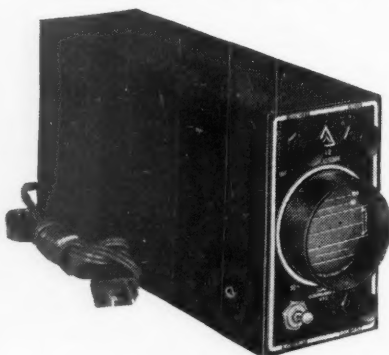
10 HENRY 300 MA. CHOKE



A terrific bargain. Audio Development Co. high-quality 10 Henry 300 MA. filter choke. All black-crackle finish, new, 100 ohms DC resistance, very compact, 4 3/4" x 3 3/4" x 4 3/4", 10 lbs. only.....

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Trapezoid or Wave Form patterns.

Relay terminals for stand-by blanking.

Compact—3" x 5" x 10", uses 902, 6C4, built-in 110-volt AC power supply, 60-cycle sweep.

COMPLETE WITH TUBES, INSTRUCTION BOOK.....

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Steinberg's

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(Continued from page 98)

GU, vice-pres.; MEL, secy.; MHL, treas. HEV is wrestling with a.s.s.c. PAA maintains regular schedules with HC2EG. AGM is the new EC for Oklahoma County. EHC has returned to regular schedules with his brother 0FXQ. IGO reports to OLZ from Albuquerque. MBV made the Brass Pounders League. NMM works OLZ into Southern Border Net. KDH works OLZ into Missouri, Arkansas, Kansas, and Tennessee. Traffic: W5MBV 544, NMM 214, KDH 146, AST 124, JKS 46, IOW 35, PA 19, ADZ 15, HXG 12, FRB 4.

NEW MEXICO — SCM, Lawrence R. Walsh, W5SMA — SEC: ZM, RM: NXE, PAM: FAG. The LARAC held a Field Emergency Test the week end of Sept. 25-26. Stations in the field were NXE, MYQ, GXU, ZM, and OMR. Stations participating from home QTHs were SMA, OXC, AFU, and UFA. The 80-meter C.W. Net on 3705 kc. was activated and NXE was elected RM. The 75-Meter 'Phone Net is progressing FB. Stations calling in are LYQ, FAG, ZU, HJF, BIW, OXC, GXU, and SMA. KP4EF/5 has a rig on 7- and 14-Mc. 'phone and c.w. from Fort Stanton. FAG reports that the Albuquerque ARC gang holds schedules on Wednesday and Thursday evenings, trying to work El Paso on 144 Mc. Frequency is 146.8 Mc. ELL will be on 50 and 144 Mc. with sixteen-element beam. BNR is very active on 28-Mc. DX. HSO has a new beam. LGS has 112 countries now. LYQ is encasing his rig to protect it from the jr. operator. KZU may be seen on KOB-T.V.'s test pattern these days. FAG completed his 14- and 28-Mc. beams. Hub can work all bands from 3.5 through 435 Mc. OXC is doing better on 1300 kc. than on 3885 kc. NVR is NCS of the L.A. 3.85-Mc. 'Phone Net. NXE is NCS of the L.A. 3.5-Mc. C.W. Net. Traffic: W5FAG 4, NXE 4, SMA 2.

CANADA

MARITIME DIVISION

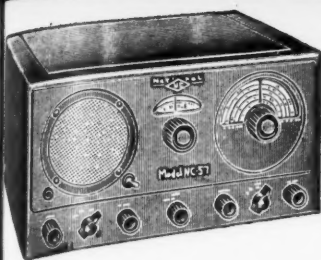
MARITIME — SCM, A. M. Crowell, VE1DQ — EC: FQ, RM: GL. The Eastern Traffic Net started Oct. 1st at 7:15 p.m. AST with the following charter members: GL, HJ, HT, MK, WC, UL, OL, TF, and UU. Net Certificates are being issued in order. Under the able guidance of our RM, GL, watch our Eastern Net grow! A special bulletin together with a list of net "Q" signals to be used in the net on 3545 kc. has been sent all net stations. All of the c.w. gang interested in traffic and good operating should contact GL for qualifying test for appointment. DQ and FQ are comparing notes on their new 28-Mc. beams. MK schedules WE and WC. VO expects to be on soon from Cross Island. BC's new five-element 28-Mc. beam is attracting plenty of attention. QZ WACed and worked plenty of DX while on his vacation. MZ has sold most of his gear and has moved to Chicago. The HARC lost one of its most ardent and energetic members when MZ moved to Chicago. PT is getting the new 14-Mc. beam ready. A most successful and happy outing was held recently by the HARC under the direction of FQ. Club secretaries: How about contacting one of our net stations and giving news of your club for our section report? Traffic: VE1GL 36.

ONTARIO DIVISION

ONTARIO — SCM, Thomas Hunter, jr., VE3CP — Asst. SCM, M. J. McMonigle, AWJ. SEC: KM. RMs: ATR, AWE, BUR, DU, GI, TM, and WX. PAMs: DD, FQ, and RG. The first meeting of the Nortown Amateur Radio Club, Toronto, was attended by approximately 100 hams. Officers are: RU, pres.; BQP, vice-pres.; Dick Roberts, secy.; and Jack Sherman, treas. The address of the club is P.O. Box 7388, Toronto. The Niagara Peninsula Amateur Radio Club has elected AFI as chairman and AUQ as secy.-treas. pro tem. The Kirkland Lake Club sponsors code practice on 7034 kc. nightly at 7 p.m. under ALU, BNI, and AZZ. AWE is on with 500 watts to 813s. GI is heard occasionally on 3.8-Mc. 'phone. ANH now has WAS. AQN is back on 28 Mc. BBQ reports for the Kirkland Lake gang. AWJ transmits Official Bulletins on 3535 kc. Mon., Thurs., and Fri. at 9:00 p.m. and NI carries the same bulleting on 3825 kc. at 9:30 p.m. on Tues., Thurs., and Sat. WK will take traffic for Alaska, Hawaii and N.W.T. DH is back on the Beaver Net. BMG works on both the Beaver and Ontario 'Phone Nets. WY is back on 3.5 Mc. FP, XG, and BIW have t.v. receivers in operation. VD keeps schedules with Chicago and N. Y. C. AXQ is active on AFARS Net. The following will be pleased to pass along information to any that are interested in section nets: DU for OBN, DD for "A" Net of OFN, RG for "B" Net of OFN, ATR for Ontario 40 Meter Net, GI for the Eastern Ontario Net, KM for Ontario Emergency Net, VU for AFARS Net, BJG, BCA, BJE, PA, and ALT have new beams. AAQ has five-element beam on top of 50-ft. tower complete with platform and ladder. MY needs Asia for WAC. Traffic: (Aug.) VE3IA 26, WK 7. (Sept.) VE3ATR 87, GI 81, BUR 66, IA 41, BMG 39, RG 31, AWE 30, WK 29, WX 27, DU 24, DU 24, AWJ 19, CP 18, KM 17, AP8 16, NI 10, FQ 8, DD 7, AQB 6, HK 4, TM 2, ZE 2.

(Continued on page 104)

BE VALUE-WISE . . . CHECK THESE "BUYS"



NATIONAL NC-57

- ★ 540KC — 55MC continuous tuning in five bands
- ★ Direct calibration on main and electrical bandspread dials
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Famous NATIONAL performance features . . . at a reasonable price . . . make this an outstanding all-purpose receiver value. Extreme bandspread tuning provide satisfying amateur operation, yet the basic simplicity of control makes this an ideal receiver for general household use. And smooth, clean lines please the eye wherever this modern receiver is installed. Price, including a full set of nine tubes, **\$89.50**

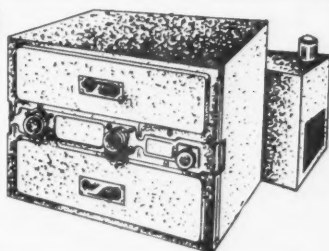
On our "play as you pay" terms, \$17.90 puts the NC-57 in your ham shack.

A RARE BUY in VHF GEAR SCR-522 XMTR-RCVR

\$33.95

The ideal set for 100-156 mc work . . . receiver is 10-tube superhet with 3-microvolt sensitivity . . . 7-tube, 15-watt xmtr. Used, but very clean. With full set of tubes. Price only \$33.95. Conversion and schematic instructions included. Available separately 25c per set.

Spare 832's for SCR-522 . . . \$2.65 each



CO-AXIAL DIPOLE

Was \$12.50 now only **\$6.50**

For fixed-station or mobile use. Matches 50-55 ohm coax cables. Continuously adjustable for use with your SCR-522.



T-17 HAND MIKE 89c

Brand new carbon mike with push-to-talk switch, cord, and plug.



SPECIAL COMBINATION OFFER

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Six for	23.10	3E29	3.49
807	1.15	3BP1	2.39
811	1.79	3C24/24G	.67
814	2.95	5BP1	1.49
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830B	3.95	211	.69
866A	.98	316A	.49
VR150	.79	705A	2.95
6AC7	.99	717A	1.65
6AG5	.99	801A	1.49
6C4	.29	803	8.95
6AG7	1.06	805	4.95
6J6	.89	807	1.15
6H6	.68	809	1.65
		813	7.95
		826	.49
		829B	4.95
1A3	.79	832A	2.65
1A5	.65	836	2.25
1L4	.79	837	2.25
5Z3	.67	838	3.95
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VR90	.75	872A	1.75
VR105	.75	931A	2.39
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3FP7	2.98	8005	4.95
2D21	.98	9001	.49
2K33	\$45.00	9002	.69
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Going fast — but limited quantities still available. **ORDER NOW!**



A. Power Transformer — Pri. 110 v., 60c., Sec. 420 — 360 — 80 v., 250 mls. Fil. 6.3-5-2.5 v. All C.T. **\$3.69**

B. Bias transformer Type U8383 — pri. 115 v. 60 cycles; sec. 215 v. CT 300 ma, 5 v. CT 6 amp. Size 5½ x 6 x 4. Weight 9½ lbs. **\$1.39**

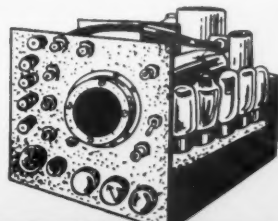
C. Bias transformer Type UX9112A — pri. 115 v. 60 cycles; sec. 280 v. CT 1.2 amp. Size 4½ x 5½ x 6½. Wt. 15½ lbs. **\$1.39**

D. Dual Section Choke Type WX5148 — each section 1.75 Hy, 250 ma, d-c res. 42 ohms. Size 6¼ x 3¾ x 3¼. Wt. 7½ lbs. 4 10/32 holes for mounting. **89c**

BC-929-A OSCILLOSCOPE

Priced for quick clearance **\$9.95**

This 3-inch radar-type scope is readily modified to use as a modulation indicator or a panadapter. You can run it on 60 cycles by hooking a 150-watt lamp in series with the input to the 400-cycle power supply. Handy size — 8 x 9 x 14 inches. Complete with 3CP-1 CR-tube, 2 — 6H6GT, 2 — 6SN7GT, and 1 each 6GG, 6X5GT, and 2X2. Good used condition.



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VERY SPECIAL
1616 ea. \$.49
6 for 2.49
limited supply





BC 459
VFO
Bandspread
Calibrated
Dial
For 10, 15, 20
and 40
Meters

With the addition of two gears and a translucent white plastic dial with silk-screened calibrations, you can give your BC-459 that commercial VFO look and greatly increase its versatility by making it easy to QSY and to pick exact frequencies on all four bands.

The 40-meter band is spread over 270 degrees, is divided into 5 KC divisions and can be read to 1 KC with good accuracy. The dial is also calibrated for the 20, 15 and 10 meter bands. The 10-meter band is on the outer edge of the dial.

We have the complete kit in stock - it's easy to install - instructions furnished. Quantity is limited so order now. Available only from SREPCO.

STOCK NO. C-909A **\$4.50 net** Add 20¢
BC-459 Calibrated Dial Kit for Postage

The kit can also be furnished with a blank dial for calibration of the amateur bands on modified BC-457 and 458 Transmitters. The dial has 360 degree markings and guide circles and has a mat finish which takes pencil or ink markings.

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SCR-274N Components

TRANSMITTERS

BC-458 — 5.3 to 7 Mc., Brand New. \$5.95 ea.

Used. \$4.95 ea.
Easily modified to cover 40 meters. Makes an excellent 40 meter xmt'r and VFO for 6, 10, 11, 15 and 20.

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Makes an excellent 80 meter fixed or mobile rig.
The above transmitters use a 1626 low drift triode in a stable oscillator circuit and parallel beam power 1625's as an amplifier. They are capable of 50 watts output. Conversion instructions with printed calibrated scales furnished with each transmitter.

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BC-454 — 3 to 6 Mc., Used, with Dynamotor. . . \$5.95 ea.

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All of the above receivers are 6-tube superhets. Compactly built and extremely sensitive. Ideal for Mobile, Fixed or Portable use. Require only the addition of a power supply, gain control, and BFO switch.

Use B-785 Brass Spline for tuning SCR-274N Receivers. Fits geared shaft of tuning condenser. 7/32" Dia. Shaft takes crank or knob with 1/4" hole. **Only \$9 each.**

BC-456 Modulator, Used, w/DM-33 Dyna-

motor, Tubes, Plugs and Diagram. \$2.95 ea.

BC-456 Modulator, Brand New, with Tubes and Diagram, less Dynamotor and Plugs. \$2.95 ea.

Following items are Used, with Plugs

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FT-226 — 2-Section Transmitter Rack.98

BC-451 — Transmitter Control Box.49

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BC-442 — Antenna Relay Unit, with RF Current Meter and Vacuum Condenser. 1.95

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QUEBEC DIVISION

QUEBEC — SCM, Gordon A. Lynn, VE2GL — QQ has been appointed SEC and is looking for EC appointees in Three Rivers district and Quebec City. TM now is OBS. BB is back on SSN, ESN, and TLS after vacation in VE6 Land getting his hands blistered in the grain fields. NR has new rig now operating but still is chasing few bugs although he is sending code practice. TR, ABJ, and ACD are equipped with splendid 28-Mc. rotary beams. EC reports daily schedules continue with RM, EV, AEM, AHN, OD, and ABJ. While his XYL is overseas, LO is too busy batching it for much hamming, but he schedules WILM, VE3WK, and VE2BB regularly. AGG keeps pounding away on 7 Mc. from Drummondville and is planning QSY to 14 Mc. to see what's doing there. Efforts are being made to form a South Shore v.h.f. radio club. All v.h.f. and would-be v.h.f. hams are invited to contact LP or RC for information. LP made first reported QSO between Montreal and Ottawa on 50 Mc. Activity on 50 Mc. continues high but reports are scarce. Shoot them in, please. GN reports that 144 Mc. is extremely quiet. He suggests that instead of just listening that the boys do lots of calling. If everyone listens only there is nothing to hear. Contact him at PL 9211, local 217 or AT 4973 with news and to arrange schedules. Out-of-town stations should write him for schedules. MG has WAC with 10 watts on 28 Mc. ACF is on 28 Mc. with 30 watts and two-element beam. Get those reports coming again. Traffic: VE2EC 23, LO 14, GL 5, BB 2, KG 2.

VANALTA DIVISION

ALBERTA — SCM, Sydney T. Jones, VE6MJ — Newly elected officers of the NARC are: PV, pres.; VJ, secy.; EE, FB, LG, and KF, executive committee. BW works out well with mobile rig in his car. JJ reports good contacts with portable rig. NA reported on emergency set-up at Medicine Hat. The gang is leading the field in this district. OD and LZ keep nightly schedules on 3.8 Mc. Both are interested in frequency measuring. EA is experimenting with new modulation circuit. WS has five-element beam in working order but reports DX spotty as yet. HM has installed new 28-Mc. beam on roof and hopes to work an African for WAC. JP added another 813 to the final. Listen for Official Bulletins from his station Tuesdays and Fridays at 7:30 p.m. on 3803 kc. MJ has good luck with Harvey UHX 10 transmitter on 28 Mc. running 12 watts. LA has finished work on his farm and is all set for winter session of hamming. DW was visitor in Edmonton. NARC purchased Ditto machine to relieve the secretary of considerable work. More members are needed in Emergency Corps. Contact the SCM for details. Have your club secretary send in a monthly report of club and member activities.

PRAIRIE DIVISION

MANITOBA — SCM, A. W. Morley, VE4AM — Winnipeg now has OBS on all bands with VE4RP taking over on 14 Mc. Brandon is covered by IF on 14 Mc. HA, a new one at The Pas, reports 35 contacts, including a VK4, his first month on. HB, another new ham, made his first contact using a 6L6 on 7 Mc. Welcome, fellows, and thanks for reporting. LC is one up on RO — ST2MP!! EA has his RCC Certificate. GI and DP raised the power and have new beam. In Dauphin, AP is submitting an account to the power company for street lighting. XP blew modulation transformer and is on c.w. AW is on 3.85 Mc. occasionally. VK has new beam up for 14 Mc. 3BGN visited KK. NX reported traffic for the first time and is interested in ORS. QV has new 66-ft. tower and three-element 14-Mc. rotary on it. 5AO now is signing IW on 3.85 Mc. KX is working portable from McArthur Falls. FU, Winnipeg District EC, gave a talk to the WARC. The hamfest was enjoyed by many. GI and DP made the corn roast a success. TL "I" opened with a bang. Connections are extra good this year. Route your traffic via any Manitoba station on 3.5 to 4 Mc. It will go on the line. Traffic: VE4AM 32, NX 2.

Strays

"What's in a name?" department:

W0MSW and W0BCT are both named *Coil*.

W0BIB lives on *Shields* Ave.

W0HCK lives on *Hamline* Ave.

W0QH is appropriately named *Messenger*.

— W3QP

A toy "arrow" (wooden dowel with rubber suction cup at one end) is a handy gadget for replacing metal tubes in hard-to-get-at sockets. Newberry's has them at three for a dime.

— W1RQR

HARRISON HAS IT!



BEAM ROTATORS

These sturdy, dependable units, manufactured at a cost of several hundred dollars each, to control the pitch of propeller blades, make an excellent beam rotator!

Brand new, complete with detailed conversion and installation instructions. **\$15.95**

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COUPLING UNIT: Thick walled dural tube 2.75" OD x 8", precision machined. Top end threaded to take standard pipe fittings (or mast pipe up to 2" OD can be inserted and pinned). Beam with coupling unit can be slipped into place after rotator has been mounted, and locked with a screw-driver. No machinery or welding required!

Complete with special steel torque and locking pin, load bearing thrust pin, bolts and detailed instructions. **\$7.50**

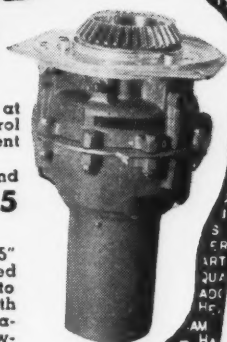
STEP DOWN TRANSFORMER **\$5.95**

DIRECTION INDICATOR KIT (with special gear) **\$14.75**

— SPECIAL OFFER —

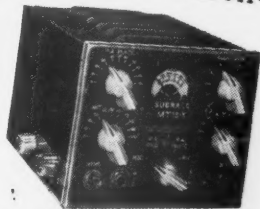
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OHMMETER: 0-5,000-50,000-100 Megohms (Reads ONE Ohm)
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AC VOLTS: 0-10-100-250-1000
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DC MILLIAMPS: 0-5-100-1000
DECIBELS: Four Ranges -9 to +55 DB

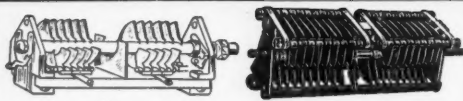
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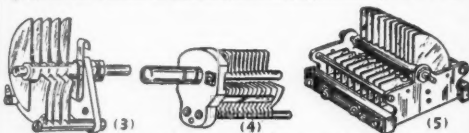


(1) **Hammerlund Type "HFD" Micro**. Double spaced, 1500 volts, .030" spacing. Screwdriver slot for tuning, with shaft lock. Soldered brass plates, cad. plated. Aluminum end plates mounted on isolantite base. Has isolating center shield. Silver plated rotor contacts can be shifted to 3 position for shortest possible leads. *Made by Johnson.

*Type **HFD15X**, 16 max.-3.8 min. mmfd., 11 plates per section. Stock No. 14A680, size 1 1/16 x 1 1/2 x 3". **99c**

*Type **HFD30X**, 28.5 max.-5 min. mmfd., 19 plates per section. Stock No. 14A681, size 1 1/16 x 1 1/2 x 3 5/8". **\$1.19**
SPECIAL EACH

(2) **Johnson Dual 207 Mmf. Type 200FD20**. .045" spacing, 2000 volts, 207 mmfd. max.-13 min. per section. No. 18A510, size 2 1/16 x 2 1/4 x 8". **\$1.95**
\$10.00 List Value. **SPECIAL EACH**

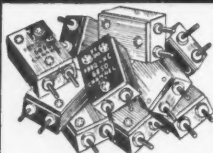


(3) **Johnson Type 12G70**. 12 max.-6 min. mmfd., 7 plates .225 spacing, 1/4" shaft 1 1/8" long. Has single end plate of seatite, .032" rounded aluminum plates. No. 14A677, size 2 1/16 x 2 7/64 x 2 5/8". Spec. Ea. **\$1.49**

(4) **Johnson Type 50G20**. 52 max.-5 min. mmfd., 9 plates .045" spacing, 1 5/32" long otherwise as above. No. 14A679, **SPECIAL EACH**. **99c**

(5) **Cardwell "Midway"**, 74 Mmf., 19 plates air gap .070". Aluminum frame, brass bearings, plates buffed and rounded. Mycalex insulated, 1/4" shaft. No. 18A853, size 2 3/4 x 3 1/4". **\$1.45**
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1012-14 MCGEE STREET, Company
KANSAS CITY 6, MISSOURI

VFO Unit

(Continued from page 15)

mounted in the rear edge of the chassis. The output may be either capacitively coupled or link coupled to a following stage. The two power switches and the key jack are set in the front edge of the chassis.

Adjustment

The adjustment of the unit is very simple. The VR resistor, R_4 , should first be set so that the VR tubes stay ignited with the key closed. VR-75s or VR-90s may be used, the higher voltage giving somewhat greater output from the unit. Then, the tuning condenser C_1 should be set at maximum capacitance. Listening on a receiver tuned to about 3490 kc., the oscillator padder, C_2 , should be adjusted until the oscillator signal is heard at that frequency. The oscillator tuning should then cover the range up to a frequency slightly higher than 4000 kc.

The amplifier padder is adjusted by tuning the oscillator to the approximate center of the band and adjusting C_{11} for maximum grid current to the following stage. If the coil dimensions have been followed carefully, the output should then be substantially constant over the entire band. The 1750-kc. output coil should be used in feeding a crystal stage normally using 3.5-Mc. crystals, while the 3.5-Mc. output coil should be used in cases where 7-Mc. crystals are normally employed.

The output from the unit as described was found to be sufficient to drive a pair of 807s directly as straight amplifiers at maximum rating at 3.5 Mc. Keying, even with appreciable lag in the keying circuit, is virtually chirpless when listening at 28 Mc., and frequency drift, even from a cold start, is negligible. The adjustment of output loading will have some effect upon frequency. Shorting the output terminals causes a change of about 500 cycles at 28 Mc. when the output stage is doubling frequency and somewhat more with 1750-kc. output. The tuning of the output circuit of a following crystal stage changes the oscillator frequency a matter of a few cycles at 28 Mc.

Strays

After searching for two weeks to find the source of scratching and clicking noises in his receiver, W. W. Bonn of Atlanta discovered that walking across the floor caused ungrounded "BX" cable to make intermittent contact with the furnace and water pipes. Correction was accomplished by grounding all "BX" casings.

SWITCH TO SAFETY!



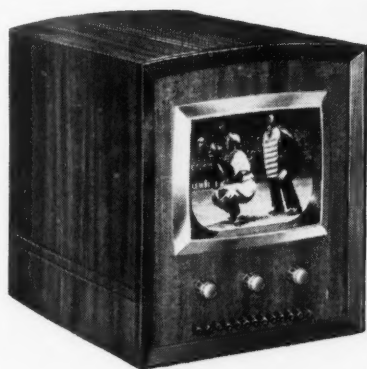
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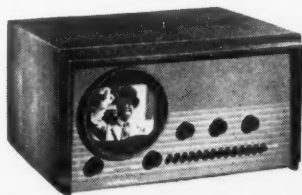
NEW! Hallicrafters 10" Direct-Viewing Television Receivers

Here's video that satisfies—a sharp picture with real stability and good contrast—at a price you can't beat for the quality. Features include: 12 channel push-button tuning; RF amplifier; 3 IF amplifiers; 2 video amplifiers; improved sync circuits; AGC; inter-carrier FM system. Complete with 19 tubes, plus 10" picture tube and 3 rectifiers. In rich mahogany table cabinet. 110-125 volts, 50-60 cycles AC.

97-804. Hallicrafters T-67. 10" TV wood table model. NET, f.o.b. Chicago..... **\$295.00**

97-802. Hallicrafters T-61. As above, but in black plastic cabinet. NET, f.o.b. Chicago..... **\$279.50**

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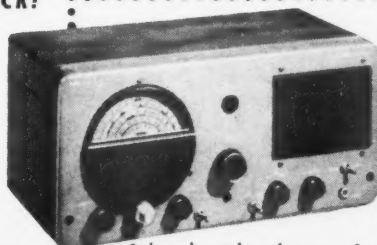
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97-806. Hallicrafters T-54, as above, in gray steel cabinet. NET, f.o.b. Chicago. **\$189.50**

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**For Airports—
Airplane Owners!**

Ideal for getting weather reports from range stations. Also covers standard Broadcast and HF Air-

craft bands. 4-band range from 140 kc to 12.0 mc, plus 3 pre-set frequencies—one between 200 and 300 kc, and two in the 2 to 3 mc range. Has BFO pitch control; ANL; tone control; permeability-tuned IF's; universal antenna input. Accurately calibrated dial with inertia flywheel drive. Built-in PM dynamic speaker. All metal parts plated to resist corrosion. For 110-120 v. AC or DC (6, 12, or 32 volt power packs available at \$22.50 extra). Complete with 9 tubes and rectifier.

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West Hartford, Connecticut

108

Life for Old Receivers

(Continued from page 19)

short length of coaxial line ungrounded and to use something other than a coaxial fitting for connecting the antenna. If your antenna uses 600-ohm line or tuned feeders, the best bet is a small antenna-tuning unit link-coupled through a length of RG-59/U to the converter input.

There is nothing sacred about the crystal frequencies used, other than to be sure that they have no harmonics falling within the signal-frequency range. For the crystals suggested in the coil table, the receiver tunes from 4 to 3.6 to cover 14 to 14.4 Mc. (yes, it tunes backward!), 3.375 to 3.825 for 21 to 21.45 Mc., and 3.5 to 5.2 for 28 to 29.7 Mc. The 27-Mc. band is also covered by the 10-meter converter, by tuning your receiver below 3.5 Mc. How you build the converter and what first i.f. (tuning range of your receiver) you will use will depend on the crystals you can dig up and the range your present receiver tunes. Using the second or third harmonic of the crystal should be satisfactory in practically every case. By careful selection of crystal frequencies, you can arrange things so that the band edges start at some even 100-ke. mark on your receiver, thus giving you frequency-calibrated reception (with the necessary mental correction factor).

Once you have enjoyed the advantages of stable high-frequency reception, it is unlikely that you will ever want to go back to the old-fashioned technique of drift-and-follow. You will also find out rather quickly which of your friends have the drifting signals and which ones are rock-steady. And knowing that your receiving system is about as sensitive as they come will remove some of those doubts that may have always been present. From there on, you can concentrate on the real secrets of DX reception: antennas and real estate.

V.H.F. Man's VFO

(Continued from page 25)

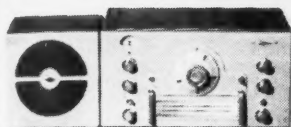
be regarded as merely an approximation, and not relied upon for band-edge work, the calibration process may be carried out with the aid of any receiver having a reasonably-accurate dial. The 50-Mc. range, requiring the least padder capacitance, should be calibrated first. The trimmers C_9 and C_{10} (mounted on the tuning condenser, C_1) should be set near maximum capacitance to provide the proper bandspread, approximately 55 divisions near the middle of the tuning range of C_1 . The 144-, 28- and 27-Mc. ranges should then be set up, by means of their padders which are under the chassis.

Operation of the amplifier may be checked with a dummy load made up of two 250-ma. pilot lamps connected in parallel. With 300 volts on the 6AG7s the lamps will light to approximately full brilliance with the stages properly tuned. Once the proper settings for C_2 and C_3 are found, it is

(Continued on page 110)

Merry Christmas from all the gang at Happy New Year HARVEY

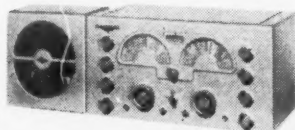
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HRO-7
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with power pack and 8" speaker. Shpg. Wt. 65 lbs.



NC-173
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Calibrated bandspread for 6, 10-11, 20, 40 and 80 meter bands. Covers 540

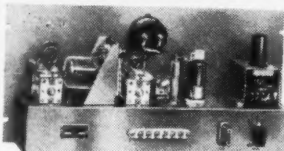
kc to 31 mc plus 48-56 mc. Includes PM speaker. Shpg. Wt. 55 lbs.



90711 VFO
\$89.75

ECO of exceptional stability and low drift. Band spread dial has separate scales for 80, 75, 40, 20, 15, 11 and 10 meter bands. Separate selector switches for function,

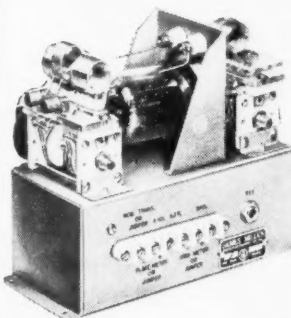
tuning range and output band. Shpg. Wt. 30 lbs.



90810
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HF transmitter for 2, 6, 10, 11 meters, rated 75 watts output. Crystal control or use 90711 Coils

are available for 2, 6, or 20 at \$3.60 per set. Shpg. Wt. 25 lbs.



90811
\$33.00

75 watt final for all bands 2, 6, 10, 11, 15 and 20 meters. Uses 829B, same as final of the 90810. Excellent P.A. for mobile. Comes equipped with 10 meter grid and plate coils; coils for 2-6 and 20 are available at \$3.60 per set. Shpg. Wt. 6 lbs.

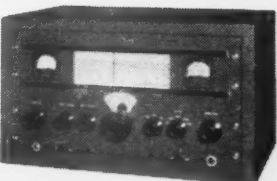
Collins 75-A
\$375.00

80, 40, 20, 15, 11 and 10 meter ham receiver. Automatic noise limiter, high sensitivity, double conversion. With speaker in matched cabinet. Shpg. Wt. 93 lbs



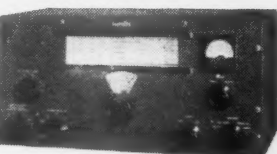
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Desk transmitter, 150 watts cw, 120 watts phone. Built-in VFO covers 10, 11, 15, 20, 40 and 80 meter bands. Built-in power supply. Shpg. Wt. 128 lbs.



310B-1 Exciter
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Self-contained band-switching exciter unit. Dial calibrated in frequency. Shpg. Wt. 48 lbs.



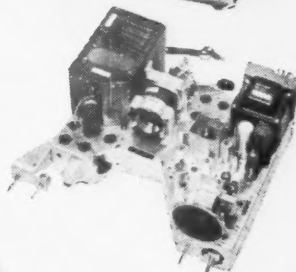
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suggested that these points for each band be marked on the panel, so that they can be reset correctly at will. As the amplifier is somewhat overdriven, the settings will not be critical, and it will ordinarily be possible to shift frequency over an entire band without resetting these adjustments, if they are set up originally near the middle of the band in question.

Operation of the reactance modulator may be checked readily by monitoring the signal from the VFO unit in a receiver operating on the band in which the transmitter is to be used. Unlike amplitude modulation, which must be checked with the high-powered stages running at full input, n.f.m. may be monitored accurately in one's own station. There is really no excuse for poor-sounding n.f.m. — your own receiver will tell you how it is going to sound on the air, without any on-the-air or dummy-load testing. Start with the crystal filter in its broadest "on" position, and set the deviation up to the point where normal speech comes through cleanly, without roughness, as you tune down either slope. That is a good starting point for putting the rig on the air. It may be necessary to change the deviation *slightly* one way or another to satisfy different receiver bandpass characteristics, but you can't go far wrong with the above method. At least you will not be guilty of emitting the hash that is all too prevalent in n.f.m. operation as it is practised by some users.

If the reactance-modulator portion is not to be used, the r.f. section may be operated at voltages as low as 200 or less, and still provide enough output for most purposes. The speech gain drops rapidly at supply voltages under 300, but the r.f. output is adequate for use of the unit as a crystal substitute at much lower voltages. It was designed for use with rigs that normally operate on 11, 10, 6 or 2 meters, to serve as an f.m. exciter for the first stages of a rig for those bands, but, since its output frequency is 6.75 to 9 Mc., it may also be used for a.m. or c.w. work on 40 or 20, and for the new 21-Mc. band when that assignment is released for amateur use.

I.A.R.U. News

(Continued from page 28)

SWEDEN

The *Sveriges Sandare Amatorer* reports that its membership has more than tripled from its pre-war total, S.S.A. now having well above 1500 members, of which more than 1000 are licensed amateurs. The president of the society is Gösta Siljeholm, SM5SI; the honorary secretary and editor of SSA's official journal, *QTC*, is Hans Eliaeson, SM5WL; and Ake Alseus, SM5OK, is QSL manager.

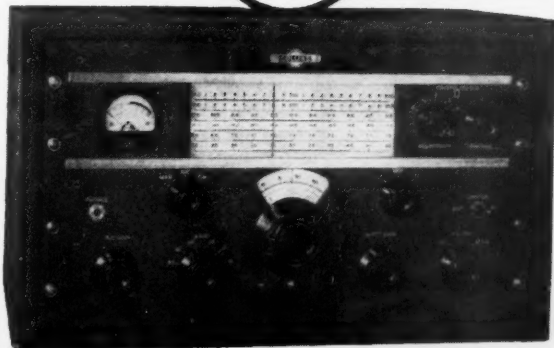
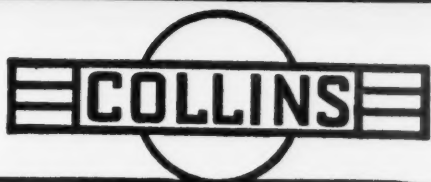
Postwar regulations for amateurs in Sweden, patterned after the United States FCC regulations, provide for three classes of radio amateurs:

Class C, issued to qualified beginners between 16 and 18 years of age. Applicants are required to pass a simple test of their knowledge of the

(Continued on page 112)

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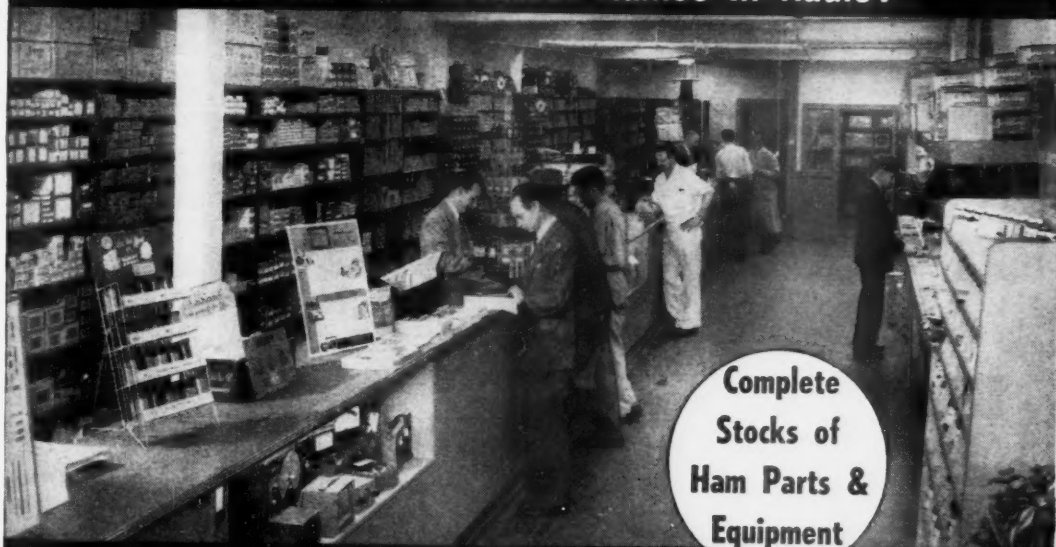
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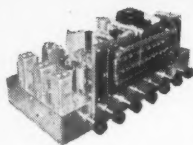
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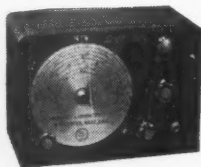
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RADIO RECEPTION WITH THE
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Model RJ-20 gives you high-fidelity reception on both FM and AM. Armstrong FM circuit gives maximum noise reduction with response to 15,000 cycles • separate RF and IF systems for FM and AM • variable bandwidth IF • two audio stages give 20 db bass or treble boost • 6AL7 eye for precise tuning • self-contained power supply. *Model RV-10* is the tuner for straight FM, delivering stable high-fidelity output to your audio system. You can pre-judge performance of both tuners from the curves in Data Sheet H-811. Write now for your copy.

✓ *Check with Browning*
AMATEUR FREQUENCY METER MJ-9



Reads directly on 7 bands from 3.5 to 148 mc.

Accuracy .05% at all frequencies.

A stable VFO with output voltages comparable to a crystal; lets you work band edges.

Stable — compact — large easy-reading dial — all controls on front panel — low power consumption at 110-120 volts a-c-d-c.



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fundamentals of electricity and an 8-w.p.m. code test. The society may certify to the technical knowledge of the applicant, in which case he is relieved of the necessity of taking the written examination. Class C licensees may operate only on amateur bands above 58.5 Mc. and are permitted a maximum input power of 5 watts.

Class B amateurs must be over 18 years of age. They may use any authorized mode on amateur frequencies above 30 Mc., with maximum input power of 50 watts and are privileged also to employ c.w. only on the 3.5- and 7-Mc. bands. Applicants for this grade of license are required to undergo a somewhat more difficult theory examination and must pass a 12-w.p.m. code test.

Class A applicants must have held a Class B license for at least one year and are required to pass a theory and code (16 w.p.m.) examination. Class A licensees are permitted to use any amateur band, either 'phone or c.w., and may have a maximum of 500 watts input power.

Upon special application, Swedish amateurs may be permitted to use the 50-52 Mc. band. Their activity on this band is increasing rapidly, with some European DX already reported.

Three-letter calls are now being issued to Swedish amateurs, permutations in the two-letter series having been exhausted. In addition to the SM prefix, some calls in the SL series are issued to military off-duty stations which are permitted to operate in the amateur bands.

AUSTRALIA

To perpetuate the memory of those Australian amateurs who gave their lives for their country during World War II, the *Wireless Institute of Australia* will sponsor a Remembrance Day Contest annually on the week-end nearest to August 15th in each year — the date on which hostilities ceased in the Pacific area. The contest is open to all Australian amateurs. W.I.A. will award attractive certificates to the three highest stations in each Australian state and also a perpetual trophy to the state having the highest average score of the six highest scores submitted. The state winning the perpetual trophy will retain it for a period of 12 months or until another state merits the award.

Effective June 1, 1948, the following frequency bands were authorized for use by Australian amateurs: 3.5-3.8 Mc.; 7-7.2 Mc.; 14-14.4 Mc.; 26.96-27.23 Mc.; 28-30 Mc.; 50-54 Mc.; 144-148 Mc.; 288-296 Mc. (temporary); 576-585 Mc. (temporary); 1345-1425 Mc.; 2300-2450 Mc.; 5650-5850 Mc.; 10,000-10,500 Mc.; 21,000-22,000 Mc. (temporary); 30,000 Mc. upward (temporary).

BULGARIA

The Headquarters has been informally advised that amateur licensing, after many years of no official amateur radio, has been inaugurated in Bulgaria. Our informant says that the first official LZ amateur license issued was LZ1AA. No official confirmation of this action has been obtained.

ENLARGED TO SERVE YOU BETTER!

TERMINAL'S AMATEUR, SOUND & TV DEPARTMENTS

AMATEUR DEPARTMENT

Signal shifters and VFO's enable hams to easily and quickly select any desired transmitting frequency. This convenience is a sure-cure for QRM headaches!

EARN \$50 FOR 3 HOURS FUN?

Then buy the famous Meissner EX Signal Shifter in kit form! You save \$50.00 by building it yourself! The EX is an extremely stable ECO with more than 6 watts output on all bands. Regulated power supply operated from 110 volts, 60 cycles AC. Everything is supplied—punched chassis, 5 band coil turret assembly, all tubes, all parts, cabinet, panel—even machine screws, leadwire and solder! To own a Meissner EX, all you need is three hours time, the usual tools and

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MILLEN'S NEWEST VFO — Model 90711

Many desirable features are incorporated in the new MilLEN 90711 variable frequency oscillator. Band switching and separate accurately calibrated band-spread scales cover 80, 75, 40, 20, 12, 11 and 10 meter bands. See complete specs in MilLEN's ad elsewhere in this issue. Complete with tubes, your cost

89.75



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Seeing is believing! Your eyes will bulge and your heart will beat faster when you see the many brand-new radio items we practically give away every week! These *Store Specials* change weekly—what you save will more than make your visit worthwhile!

If you've ever visited our busy store, you've noticed the increasing interest in our departments serving the radio amateur, sound equipment buyer and television enthusiast. These departments hum happily along because each is completely stocked with the finest, up-to-the-minute equipment at lowest prices and staffed by men who understand your problems.

Drop in now—and see the elbow-room we've added to each department to give you even faster, more efficient service!

TELEVISION DEPARTMENT

RCA 630TS KIT

Comparison will prove this 10-inch Television Kit to be the best buy of the year!

packaged by PHILMORE!



Already acclaimed the best engineered TV set of its class, Terminal's RCA 630TS-style in kit form offers the amateur constructor the easiest kit to assemble at a new low price!

Kit is furnished with 13-channel pre-tuned R.F. and I.F. section already mounted, wired and aligned; even remaining unwired tube sockets are firmly riveted in position on RCA chassis. No instruments needed or alignment required upon completion. All parts are individually packaged and clearly labeled for following the complete step-by-step, well-illustrated instruction manual. Kit includes all parts, 29 RCA tubes and instructions. Your cost, less 10" picture tube

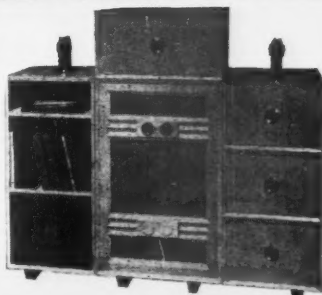
169.50

RCA 10BP4 picture tube for above kit, add. **34.00**

SOUND EQUIPMENT DEPARTMENT

Jensen CUSTOMODE, as featured in our Sound Department, is the answer to the ever expanding requirements of audio-video equipment. Today, you may install a 15" speaker, communications receiver, tuner and a record changer. Tomorrow, you can add a television set; a pick-up for Micro-groove records and a record cabinet. Designed by leading furniture stylist and electronic engineers, Customode's "building block" versatility enables you to create your own layouts as you wish, when you wish.

Suggestion: Bring the XYL to our Sound Department to see the smartly-styled Customode cabinet variations.



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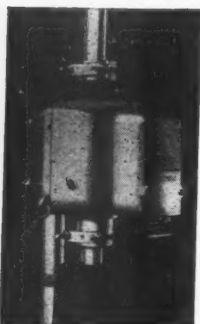
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ALLIANCE TENNA-ROTOR

\$39.95 List Price

- Will support up to 20 lbs.
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- Complete with control box.



- Weather proof.
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Send for Catalog

Licensed by Commonwealth of Mass.
Department of Education

TVI Elimination

(Continued from page 32)

By adopting the measures listed above we have so completely cleaned up our 20-meter 'phone rig that we can look at any channel while the transmitter is on the air with 700 watts, despite the fact that the television beam aims right at the 20-meter beam. In fact, all our ham antennas, as well as the transmitter itself, are between the TV antenna and New York City, where all of the TV stations are located. This is the worst possible condition. The only difference between the 20- and 75-meter finals, aside from using a pair of 813s on 20, is the use of harmonic plate traps tuned to 57 Mc. The vacuum condensers not only helped a great deal in giving the traps a chance to do a good job, but made their adjustment much less critical.

Incidentally, to get a rough idea of how much harmonic output was necessary to disrupt a television program we built a low-power battery-operated oscillator using a 957 acorn, with everything except the coil enclosed in an aluminum box. The plate power input was measured at 0.2 watt. When tuned to 56 Mc. the oscillator completely blocked the program on Channel 2 at a distance of 20 feet. When tuned to 28 Mc. the second harmonic of the 0.2-watt oscillator will take out the picture at 10 feet. On 24 Mc. it will jam the picture i.f. amplifier. Further tests along this line were made by building up a miniature "diathermy" oscillator using a 6J5 with 12 volts a.c. on the plate. The plate current was 0.5 ma., an input of 0.006 watt. This "diathermy" oscillator put a black bar in the picture at 50 feet. The above shows how completely a ham rig must be "de-loused" in order to prevent TVI.

Happenings

(Continued from page 35)

Sioux Falls, S. D.: Mar. 9, June 8.
Spokane: Apr. 27.
Syracuse, N. Y.: Jan. 6, Apr. 6-7.
Tampa, 410 Main P. O. Bldg.: By appointment.
Tucson, Ariz.: Some time in April.
Tulsa: Jan. 24-25, Apr. 21-22.
Washington, D. C., 2065 Temporary L Bldg.: Monday through Friday, 8:30 A.M. to 5 P.M.
Wichita: Mar. 10.
Williamsport, Pa.: Mar. 8, June 7.
Wilmington, N. C.: June 4.
Winston-Salem: Feb. 5, May 7.

HAMFEST CALENDAR

The next dinner meeting of the Quarter Century Wireless Assn. will be held on Friday, December 3rd, at historic Frances Tavern, Broad and Pearl Streets, New York City. John DiBlasi, W2FX, is president of the association, which now has more than one hundred members and is rapidly becoming world-wide in scope. Among the amateurs recently joining are the Honorable George E. Sterling, W3DF, of FCC; J. E. McDonald, VE3YV, Alfonso Pereyra, OA4F, B. J. Kroger, XE1KE, and Ulises Marin, KP4JA. Membership in this newly-formed social club is open only to present holders of amateur licenses who were active hams not less than 25 years ago. The dues, one dollar, are used only to defray mailing expenses.

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TO SAFETY!**





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*"More Watts
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275 WATTS PHONE OR CW

KIT FORM

\$379.45

WIRED-TESTED

\$399.45

Above is complete "Globe King" Transmitter with all tubes, meters and one set of coils in cabinet—packed in special wooden shipping crate.

The "Globe King" is a versatile advanced design XMTR Kit giving efficient performance on 10-11-15-20-40 and 80 meter bands on phone & CW. Also available in individual sections.

✓ CHECK THESE FEATURES...

- Provisions for Eco.
- Automatic Protective Bias on final and buffer.
- Front Panel control of link to final input.
- Voltage controlled osc and Buffer stages.
- New Speech Modulator circuit—modulates up to 300 watts.
- Dual power supply for OSC—buff and R. F. Stage.
- Most compact Xmtr on the market—stands 28 1/4 inches high.
- XMTR available complete or in individual sections. Write for prices.

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It is easy to buy from WRL. In most cases your present rig will serve as sufficient down payment. Tell me what you have to trade in—the kind of payments you would like to make and I will quote prices and terms by return mail. Let me equip your Ham Shack—you'll get on the air faster and for less money.
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Base Equal

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IMMEDIATE DELIVERY

on all 7 popular sizes. Note the low prices for these quality lifetime towers: 22'-\$73.50, 28'-\$92.25, 33'-\$109.75, 39'-\$129.75, 44'-\$149.75, 50'-\$175.00, 61'-\$239.75. Towers

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INSTRUMENTS

See your Jobber or write us today for Bulletin No. 11

Chicago Industrial Instrument Co.

536 W. Elm Street

Chicago 10, Ill.

25 Years Ago

(Continued from page 48)

'phone was used successfully. Thereafter other Americans followed: 2CQZ, 2AGB, 1XAQ, 2AWS. On December 12th 1MO worked a second Britisher, 2SH. Four days later, on the 16th, Canadian 1BQ, Halifax, worked British 2OD for the first Anglo-Canadian contact. Near the year's end, on the 27th, a third European country had moved into the worked column, American 2AGB contacting PCII, Holland.

Truly, as 1924 dawned, "the world was our oyster"!

Commencing with the December, 1923, issue, *QST* took on new dress. The editorial pages, heretofore located in the middle of the magazine, were relegated to more prominent position up front. "... Better to present important amateur topics for discussion," says the Editor.

"Losses"; "two-step"; "variometer"; "C-300." In anticipation of the widespread interest in improved receiving systems, we have in this issue a wealth of receiver articles. A prominent Washington, D. C., experimenter, A. L. Budlong, straightforwardly discusses "Tuned Radio-Frequency Amplification," K. E. Hassel, 9ZN, delves into "Short-Wave Tuner Design," H. Chadwick, British 2WT, describes "Some British Amateur Receiving Apparatus," and Technical Editor Kruse enthusiastically reviews the first strictly-amateur receiver to appear on the market — the Grebe CR-13.

In a double-barreled offering — "What Power Have You?" and "Miles Per Watt" — the technical editor unscrambles the common misconceptions in rating the power of c.w. rigs and argues for intelligent operating in lieu of high power in the rig. To contribute to the cleaning up of c.w. signals through improved d.c. plate supplies, we have discussion of Edison storage "B" batteries by F. M. J. Murphy, 8ML, and of the new tantalum chemical rectifiers by H. L. Olesen, 9CSR.

The passing of spark is mourned by two "old-timers" of the day. There is a nostalgic note to "Rip" Bennett's (5IP) "The Land of Blue Lightning" and "R.B.'s" "Jes' Reminiscing."

Five prominent Canadian stations are pictured and described this month: Jack Barnsley's 9BP, Prince Rupert, B. C., J. L. Miller's 2BN, Montreal, C. H. Langford's 3XN-9CF, London, Ont., J. Fassett's 1AR, Dartmouth, N. S., and 4BV, Loreburn, Sask.

Random gleanings: Karl W. Weingarten, 7BG, has been named Northwestern Division director; Canadian General Manager A. H. K. Russell, 9AL, also has been appointed to the Board. ... Many a recent raid on the OW's pantry has been traced to a new olive-bottle lighting switch, a pickle-bottle antenna insulator, or a Quaker Oats tuner. ... District of Columbia hamdom has been enriched by a new YL op, Miss Elizabeth M. Zandonini, 3CDQ. ... Director A. H. Babcock was in charge of radio for the Lick Observatory Expedition during the recent total eclipse of the sun.

TV'S BEST FOR XMAS ... SUN RADIO'S BEST FOR TV!

SAVE THOSE XMAS DOLLARS AT SUN! SHOP AT NEW YORK'S LARGEST, NEWEST SOUND & TELEVISION STUDIO!

"The latest TV sets and kits?" *Yes Sir!*
"Rock-bottom prices on everything?"
And how! "Courteous, unhurried demonstrations by TV experts?" *You bet!*

And what about sound equipment, especially high-fidelity? Sun Radio's Sound-TV Studio features, for the first time in history, "Self-Service Sound", which enables you to compare as many as 2600 audio-equipment combinations by just pushing a button. Instantaneous action. Not a plug to pull. Not a wire to handle. See it only at Sun Radio! (Only one location—122 Duane St.)

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SEND 25% WITH C.O.D. ORDERS.



Part of Sun Radio's 1000 Sq. Ft. Sound-TV Studio, showing Table-Model Television Section.

NEW HALLICRAFTERS T-67 10" TELEVISION SET



Television perfection! Big, sharp, steady picture can be viewed comfortably in a lighted room. Natural reproduction of sound via brilliant "Inter-Carrier" type FM. Select all 12 U.S. channels by just pushing a button. Don't miss another day of those thrill-

ing sports and entertainment TV broadcasts. Backed by Hallcrafters reputation for quality.

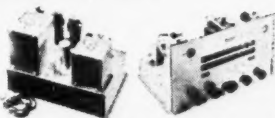
Your cost, only **\$299.95**
7" Hallcrafters T-54 **\$189.50**

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Sun Radio is your headquarters for the latest in all Transluxion products including TV kits in all sizes, cabinets, enlarging lenses, tuners, filters, etc. For the biggest stock and lowest pre-Xmas prices, get Transluxion at Sun Radio.

ALTEC TUNER-AMPLIFIER

New, brilliant, high-fidelity FM-AM 2-piece combination for home and commercial custom installation. Contains (1) FM tuner, (2) AM tuner, (3) pre-amplifier - equalizer,



(4) Separate Audio Amplifier, and (5) FM Dipole Antenna. For those who can afford the finest, here is an incomparable combination which provides perfection in sound reproduction. Hear it at Sun Radio.

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The address at the right is our *one and only* location. Despite rumors to the contrary, Sun Radio has not been bought out by any other company. We have no connection with any other company, either in or out of New York City. We do not have any branches. This is the same Sun Radio that you've known at other locations in the past, supplying the most courteous service and honest, helpful assistance in radio for 26 years.

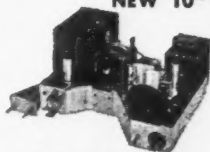
SUN RADIO 13 CHANNEL TV ANTENNA great value

The lowest-priced, best-performing, all-channel antenna you can buy. $\frac{3}{8}$ " tubing. Both high frequency and low frequency units have folded dipole with reflector. Complete with 5 foot mast and mounting hardware.

Your cost **\$8.95** High Frequency attachment only **\$2.95**



NEW 10" RCA 630TS TV KIT



With factory wired and aligned Tuner, Video, and Sound Channels. Get this new Philmore kit, the only 630TS kit with all these exclusive advantages: • All vital channels pre-wired, aligned, and tested • Sockets mounted in chassis

• Non-technical, step-by-step full sized instructions. No adjustment necessary, just assemble and turn it on. Absolutely the best TV buy today.

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HRO-7R **\$292.50**

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S-38, AC-DC **\$49.95**
S-52, AC-DC-SW ... **\$110.00**
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And Lots More!

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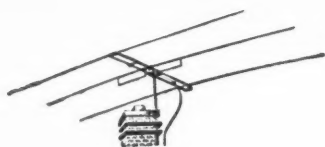


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Packed complete with insulators, frame, three pairs elements and hardware including T-match accessories and diagram.

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ARRL Week

(Continued from page 49)

QSL reports from both parties to a QSO will be expected and must be received at ARRL by March 31st to be considered for this letter recognition! Mark "ARRL Week" on these or on project reports for Presidential examination.

GPR

The Governors-to-President Relay will be the first held in 12 years! You will enjoy hearing the relay in progress, and perhaps you can participate in handling one of the 48 messages! SCMs will designate "starting stations" in each city having a state capitol. Message filings for the President, to be delivered on the day of the inaugural, will be released for radio handling at 5 P.M. EST on January 19th on the frequencies deemed most appropriate. The Washington Radio Club advises by amateur radio that it will coordinate the effort of numerous amateurs and associated club groups to look for incoming messages in the receiving area. Messages bound for D.C. can be relayed to any of the stations on the job for this purpose. A listing of stations and frequencies will be given in the next QST.

The ARRL Member Contest

The week-end radio activity is a family QSO party for all licensed League members. It is held Saturday P.M. and Sunday, during the hours indicated in these rules. To get voice contacts one calls, "ARRL, this is . . . , over," and, for c.w., "ARRL DE...K." Each member contact is credited by points and as new field-organization sections are worked each adds one to the multiplier. Members may be worked, wherever located, and they give name of country instead of section if outside the field organization — but only one section multiplier may be claimed for any or all member stations worked outside the field-organization sections that are named on page 6, QST. Within each field-organization section, to recognize competitive effort, there will be a call-pin award. Any amateur-assigned frequencies may be used, with results partly accomplished on voice, or part on c.w., or all one mode. Convenient forms will be furnished on request, but advance entry is not required.

An ARRL membership- and call-letter pin (gold border and lettering, with black-enamel background) will be awarded in each section with call of the winner engraved thereon.

Starting Time: Saturday, January 22nd, 3 P.M. PST, 4 P.M. MST, 5 P.M. CST, 6 P.M. EST or the equivalent time at any point.

Ending Time: Monday, January 24th, 12:01 A.M. PST, 1:01 A.M. MST, 2:01 A.M. CST, 3:01 A.M. EST, or equivalent.

Operate any 20 hours of the 33-hour party. State contest hours you did not operate if your score is over 20,000.

Contest Plan

Exchanges: In radiotelephone contacts the sec-

(Continued on page 120)

Our 26th Year

LEEDS

The Home of RADIO

QUALITY—PRICE
DEPENDABILITY

GREENLEE PUNCHES

Attention all Hams. Here is a Punch you've been looking for. It will cut a 2 1/4" Hole, perfect for the mounting of 3" Meters. This Punch will cut up to 1/4" Thick Steel. **\$12.95**
We also carry a complete line of Radio Chassis Punches in stock.

ISOLATION TRANSFORMERS

All 117 Volts to 117 Volts 60 Cy.
P-96, 40 watts.... **\$3.60** P-98, 100 watts.... **\$9.30**
P-97, 80 watts.... **\$5.10** P-99, 250 watts.... **\$17.70**

SELSYN MOTORS



15 volt AC 60 cycles. Transmitters only. Can be used to turn small beam antenna or as indicators only 3 1/2" diameter x 5 1/2" high. Shipping weight 10 lbs. Per Pair. Special. Per Pair..... **\$5.95**

WIRE WOUND POTENTIOMETER



100,000 ohm, precision made. G. R. type, 25 watt, 6" diameter. Brand New..... **\$1.95**

DM-43A DYNAMOTOR

G.E. New. Input 24 V. @ 23 amps. 7500 RPM; output 515/1030/28 V., @ 215 260 milliamps; filtered. Special..... **\$2.95**

OHMITE Little Devil Assortment



In all-plastic cabinet. Includes 125 selected 1/2 watt Resistors in 40 different values (10 ohms to 10 megohms). Cabinet is 9" long x 4 3/4" high x 5 1/4" deep. These boxes can be stacked. **\$10.00**

We also carry a complete line of Ohmite rheostats, variable resistors, dummy antennas, etc.

PLATE TRANSFORMERS

Amertran Heavy Duty 1500-0-1500 Volts. Tapped at 1350-1250 Volts at 1.5 amps. Pri 110/220 V. 60 cy. 10 x 10 x 7. Wt. 100 lbs..... **\$49.95**
Primary 115/230 Volt, 25-60 cycle. Secondary 820 volts center tapped at 775 Ma. Hardly any voltage drop at 950 Ma. Completely shielded. Dimensions 6 3/4 x 6 3/4 x 7 1/2. Net weight 36 lbs. Special..... **\$7.95**

FILAMENT TRANSFORMER

Primary 115-230 volt 60 cycle. Secondary 5 volts at 15 amps., 5000 volt insulation. Sells for 35T, 75T, 100TH, 250TH, HK-54, etc. Completely shielded dimensions 4 1/4 x 5 x 5 1/2. Weight 10 lbs. Special..... **\$3.95**

BIASTRANSFORMERTYPEKS8779

Completely shielded, Insulator Terminals
Primary 115 Volts 60 cycle @ 500 Ma.
180 V. @ 20 Ma.
300 V. @ 20 Ma.
Secondaries { 6.3 V. @ 1.2 amps.
5.1 V. @ 7 amps. C.T.
Special
\$1.95

STANDARD STEEL CHASSIS

4 x 4 x 2 Black Crackle..... **59c**
6 x 14 x 3 Black Crackle..... **\$1.06**
10 x 14 x 3 Black Crackle..... **\$1.44**
10 x 17 x 3 Black Crackle..... **\$1.44**

STEEL CASES

4 x 4 x 2 Black Crackle..... **67c**
4 x 5 x 3 Black Crackle..... **79c**
6 x 6 x 6 Black Crackle..... **\$1.03**
12 x 7 x 6 Black Crackle..... **\$1.91**
15 x 9 x 7 Black Crackle..... **\$2.65**

SPECIAL OFFER:—Add \$1 to any order you send and get 10 boxes of R.C.A. Parts.

STEP DOWN TRANSFORMERS

Input 220-250 Volts 60 cy.
Output 110-125 Volts 60 cy.
Primary cord and plug, Secondary, Receptical
80 watts, P-61..... **\$4.80**
150 watts, P-62..... **\$6.45**
250 watts, P-63..... **\$8.25**
500 watts, P-64..... **\$10.65**
1000 watts, P-65..... **\$20.25**

ITEMS YOU MAY BE LOOKING FOR

Multiple Contact Telephone Type Relay No. 882-2 windings 125 ohms. Each. **49c**
No. 881—Single winding 12,500 ohms. **49c**
Heinemann 5 amp. circuit breaker. **95c**
Crystal Mike and Stand..... **\$5.50**
Sockets for 813, 832, 829..... **73c**
1/4 Watt Neons bayonet base..... **20c**

POWERSTAT VARIABLE TRANSFORMERS

Type 20: 115 V. input, 0-135 V. output @ 3.0 amps. 0.4 KVA..... **\$12.50**
Type 116: mounted; 115 V. input, 0-135 V. output @ 7.5 amps 1.0 KVA..... **\$23.00**
Type 116U: unmounted; 115 V. input, 0-135 V. output @ 7.5 amps. 1.0 KVA..... **\$19.00**
Type 1126: 115 V. input, 0-135 V. output @ 15.0 amps. 2.0 KVA..... **\$46.00**
Type 1226: 230 V. input, tapped at 115 V. 0-270 V. output @ 9.0 amps. 2.4 KVA..... **\$46.00**
Type 1156: 115 V. input, 0-135 V. output @ 45.0 amps. 6.1 KVA..... **\$118.00**

RELAYS CS DIFFERENTIAL



Dual coil with armature pivoted normally open. Operates 220-250 Volts. 8000 ohms each coil, contacts S.P.D.T. Controls rated 2 amps. at 110 VAC. Ideally suited for balanced or bridge type circuits where limited current or power is available. **88c**

VARIABLE CONDENSER

6 Gang; 1 section of .00025 Mfd, 4 sections .000035 Mfd, 1 section of .00005 Mfd; with 5 air trimmers of 15 to 25 Mmfd capacity. Silver Plated. Each only..... **95c**

METERS

100 amp.—6 volt D.C., 3 inch scale, 4 1/2" square, Grey finish, supplied with 100 amp. shunt. Brand New. Each as illustrated..... **\$2.95**
0-100 Ma. 2" Rd. McClintock. **\$1.95**
0-9 amp. R.F. 2" Round..... **\$2.45**
5-0-5 amp. ch. & dis. 2" Rd..... **69c**

TUBES

5BP1 5" Cathode Ray Tubes. **\$1.29**
3BP1 3" Cathode Ray Tubes. **\$1.45**
3C24 Triode..... Each **39c**, 10 for **\$3.50**
2 x 2 879 Rectifier 2.5 volts 1.5 amp..... **49c**



RECTIFIER TRANSFORMER

Dual Primary 110 V. A.C. Each.
Secondary 0-35, 34 1/2 Volt at 3 amps. Extra **\$1.95**
0-70, 75 Volt at 3 amps. Special
This transformer is completely shielded.

If not rated 25% with order, balance C.O.D. All prices F.O.B. our warehouse New York. No order under \$2.00.
We ship to any part of the globe.

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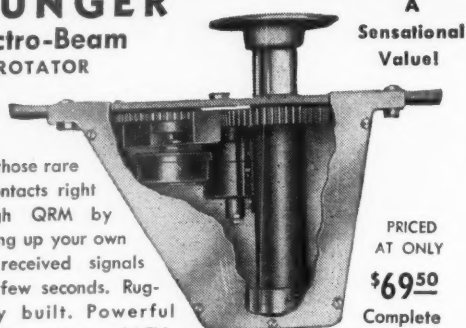
- Price Includes Reversible Electro-Beam Rotator and Accurate Direction Indicator.
- Foolproof Potentiometer and Meter Circuit. Calibrations in Both Degrees and Directions.

Free Inspection Offer!

Order today. If not satisfied, return rotator within 10 days for refund. (Control-power cable supplied at 10c per ft. in 50' or 100' lengths.)

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EVERYTHING AT YOUR FINGERTIPS...

...with this completely new, compact, efficiently designed, 30 watt transmitter, small enough to mount in most glove compartments or under any dash. For complete details write or see the full page ad in August QST.

PHOTO... **ONLY \$79.95** less tubes and accessories
1/3 ACTUAL SIZE Kit of tubes \$6.00, complete with tubes and two male antenna connectors \$87.50

SUBURBAN RADIO COMPANY
82 Hoffman Street • East Rutherford, New Jersey

SUBURBAN RADIO COMPANY MT-15X

tion, membership month and year (expiration date) will be exchanged. No special order is required. On c.w., members will abbreviate section names and use four numerals to show membership dates. "CONN 0349" will mean "Connecticut Section; my membership good through March, 1949," for example. Information to be exchanged in every case comes right off your own *League membership certificate or pocket card*. On logs show frequency bands, 'phone or c.w.

Scoring: One point for each complete set of information sent; 1 point for each set of data received and logged. No member can be worked to get more than one complete exchange for 2 points. There are two *fixed* credits that may be added before multiplier, where earned: (1) the CP credit (15 to 35) is equal to the maximum speed shown on your ARRL Code Proficiency Certificate or latest endorsement sticker in your possession. Appropriate credit for those members attaching January 13th copy will be granted if they qualify. (2) An additional credit of 50 points may be added for *radio reception and copy* of President Bailey's ARRL Week message¹ with the call, frequency and time of transmission of the station from which you received the text.

Multiplier: The multiplier is that number of field-organization sections in which *at least one* ARRL member is contacted. (Assume W5XXX has completed exchanges with 60 different stations, located in 30 different ARRL sections. His multiplier is 30.) The *sum* of contact points and either or both fixed credits, if earned, will be multiplied by the number of different sections. Any *members* located in countries outside the field organization may be worked for point credits, but section credit remains "one" for all such "outside" stations. A convenient way to keep a record of new sections as you work them is to mark the list on page 6 of *QST*.

Participants report claimed scores with the information on exchanges. Attach a copy of President Bailey's message, if received. Attach CP copy or give date and "speed" of earlier award for possible credit. Summarize and mail your score promptly. Log forms (not necessary) will be sent free on request to Hq., or rule your own, just three columns listing *calls, sections, dates*. It's a one-operator activity, although separate scores for each operator may be sent in. Fun and new contacts are assured! See how many members you can work on these dates!

50 Mc.

(Continued from page 52)

Bennington, Vt. — This town is not the sort of place you'd pick out as a spot where v.h.f. signals could be heard from any direction, situated as it is in a deep valley, with hills in all directions, but W1MEP is able to make contacts on both 50 and 144 Mc. Daily skeds are kept on 144 Mc. with W2ACY in Schenectady, about 40 miles away, and signals are consistently good. Chet's beam has to be aimed *northeast* for maximum signal, while Schenectady is almost due west from Bennington.

(Continued on page 122)

THIS STURDY ROOF-MOUNTED SELF-SUPPORTING TOWER



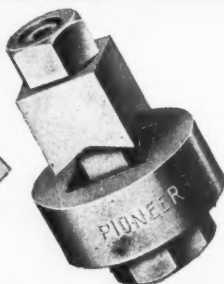
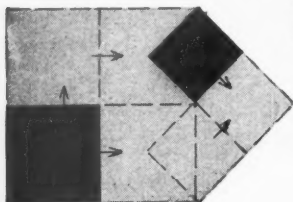
ONLY
\$37-50

Photo Courtesy
W3EAN
Drexel Hill, Pa.

Why struggle with unsightly "plumbing?" Install a neat, sturdy, professional-looking tower that is a credit to your rig and your hobby. Tower illustrated is a TRYLON standard 5-ft. spread utility base, 10-ft. high. It's self-supporting and additional straight 10-ft. sections with guys may be added at any time. Approx. Shipping Wt. 100 lbs. Write to Tower and Antenna Div., Wind Turbine Co., West Chester, Pa. for Complete Details

**TRYLON
LADDER TOWERS**

New PIONEER CHASSIS PUNCH (Pat. Pending)



**CUTS ANY SIZE LARGER
SQUARE OR ANGULAR HOLE**

For Transformers, I.F.'s, Plugs,
Binding Post Strips, Sockets, Etc.

Banished forever is hand hack sawing
or filing of holes for hard to
mount parts. Sizes to meet every
need.

**SIMPLE
HAND
WRENCH
SCREW
ACTION**



	SQUARE						ROUND					
SIZES	5/8	3/4	1/2	5/8	1 1/16	3/4	1	1 1/16	1 1/8	1 1/4	1 3/8	1 1/2
NET	\$2.95	\$3.50			\$1.95	\$2.15		\$2.30				\$2.65

Buy It At Your Favorite Distributor

PIONEER



**BROACH COMPANY
LOS ANGELES 15, CALIF.**

Tests with W2WFB, also of Schenectady, show maximum signals with the beams aimed directly at one another. In the case of W2ACY, it would appear that signals are reflected from Bald Mountain, which rises more than 2000 feet above W1MEP's elevation, on the northeast side.

2-Meter Standings

	Call States Areas			Call States Areas	
W8UKS	14	7	W8WRN	8	5
W8WJC	14	6	W0HAQ	8	-
W8WXV	13	-	W1QXE	8	2
W8CYE	12	6	W3HB	7	4
W3KUX	12	5	W0WGZ	6	4
W3RUE	11	5	W0BZE	6	3
W2WLS	10	4	W0GOK	6	-
W0NFM	9	6	W8RDZ	6	4
W0IFB	9	6	W4KKG	5	-
W3BLF	9	5	VE3AIB	4	3
W9AB	9	-	W0HXY	4	2
W4FBJ	9	5	W0JHS	3	2
W1HDQ	9	3	W0KPQ	3	2

Shepherdsville, Ky. — Tennessee contacts on 144 Mc. were provided for 10 stations in Kentucky, Indiana, Illinois and Ohio as the result of an expedition conducted by W4FBJ and W4BPE. Band conditions were just normal, and all the stations worked were ones which are consistent at the home location of W4FBJ, so he feels that only some resident activity is needed in the right spots in Tennessee to make that state workable over quite a bit of the Middle West. The site, chosen with the aid of W8ZUR/4, was a location of average height near Haysville. The rig ran 100 watts to an 829 final, with a 16-element horizontal array.

Charleston, W. Va. — More West Virginia work on 144 Mc. is in prospect, with the advent on the band of W8LYG, W8YIF and W8BKI. The first contacts were made with W8WRN, Columbus, and W8CYE, Miamisburg, Ohio, on the morning of October 7th. W8WRN has nightly skeds with W8EP, Terra Alta, W. Va., and W8BKI, at 8:00 and 8:30 respectively. W8BKI is also worked each Thursday morning at 7:15.

Champlain, Minn. — Regular schedules with W0WGZ and W0NFM (Grinnell and Solon, Iowa) are being kept by W0JHS. Contact is made only under good conditions, and then usually on c.w. The distances are between 250 and 300 miles. W0HXY in St. Cloud, Minn., has worked W0WGZ and heard W0NFM, and W0SV has been heard by W0NFM. The rig at W0JHS now runs 100 watts to 24Gs, feeding a 12-element array. This beam is similar to one section of the W2NLY 24-element job described in QST recently, but in a horizontal position.

Jacksonville, Fla. — A receiver for the high f.m. band is a handy means of checking tropospheric propagation conditions, according to W4EID. In daily observations during September, Miles found the 144-Mc. band and the f.m. band both better in the early morning hours than at other times. W4LAW and W4HAD in Tampa,

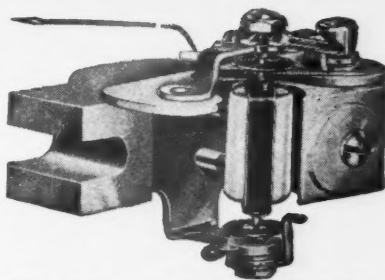
(Continued on page 124)

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UNIFORM DAMPING

**WHY BURLINGTON PANEL INSTRUMENTS
PROVIDE UTMOST RELIABILITY . . .**

MAGNETIC SHUNT as used by Burlington insures uniform damping characteristics. All ranges AC and DC available in 2½", 3½", 4½" rectangular or round case styles and are fully guaranteed for one year against defects in workmanship or material. Refer inquiries to Dept. J128.



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Plus Performance at Low Cost

TURNER CHALLENGERS



BX CRYSTAL

For recording, public address, sound systems and amateur work. Brown enamel finish. Level: -52 db. Response: 50-6000 c.p.s. With 7 ft. attached cable. List **\$10.85**

BD DYNAMIC

Same style and finish as BX. Level: -52 db. Response: 50-6000 c.p.s. Available in 50, 200, 500 ohms, or high impedance. 7 ft. attached cable. List **\$15.75**

CX CRYSTAL

Rich satin chrome finish with 7 ft. removable cable set. Moisture sealed crystal circuit. Level: -52 db. Response: 50-7000 c.p.s. List **\$16.25**

CD DYNAMIC

Same style and finish as CX with removable 7 ft. cable set. Dynamic circuit in 50, 200, 500 ohms, or high impedance. Level: -52 db. Response: 50-7000 c.p.s. List **\$19.50**

Write for Literature

THE TURNER COMPANY

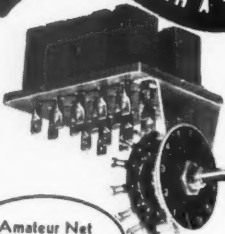
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Microphones **BY TURNER**

Microphones licensed under U. S. patents of the American Telephone and Telegraph Company, and Western Electric Company, Incorporated. Crystals licensed under patents of the Brush Development Company.

10 FREQUENCIES WITH A TWIST OF THE KNOB



THE NEW **JOHNSON**
INSTANT
Crystal Selector

Amateur Net
\$3.48

With the new JOHNSON "Instant Crystal Selector" you can QSY with the speed of an ECO and still enjoy all the advantages of xtal control! Unit accommodates all crystals with $\frac{1}{2}$ " spacing. With adaptors you can also use up to six of your upright $\frac{3}{4}$ " spaced crystals, plus four with $\frac{1}{2}$ " spacing. Extra position on switch for ECO.

Unit comes complete, ready for mounting on the front panel of your rig. Bracket permits vertical or horizontal mounting of xtals. Mounting board available separately at \$1.86.



JOHNSON

E. F. JOHNSON CO. WASECA, MINN.

COMMERCIAL RADIO INSTITUTE

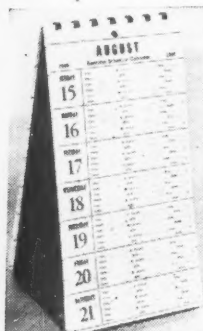
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Literature upon request. Veteran training

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XYL's! Here is an inexpensive "extra" gift for the OM! . . . A gift he can use and will appreciate. No more "losing" of his notes on schedules when you clean up the "shack".



KEEP YOUR HAM SHACK "Up-to-Date"

New! 1949 Radio Amateur's SCHEDULE CALENDAR

No "missed" schedules with this New Calendar designed for the Radio Amateur's use. Space for every detail of your schedules: Time, Station, Frequency, Name, QTH, and Beam Direction. Hang it on the wall, stand it on your receiver, or lay it on the table.

Postpaid ONLY **75¢**

If Your Radio Dealer Cannot Supply You . . . Write to

SHAEFFER STATIONERY SHOP

"Gordy" WODKE

BALATON, MINNESOTA

175 miles, were worked on several occasions, and W4AQ has been heard. The signals of W4EID have been heard by W4BYR at Lake Placid, more than 200 miles to the south, and W4QN, Orlando, has been worked.

RECORDS

Two-Way Work

50 Mc.: CEIAH — J9AAO
10,500 Miles — October 17, 1947
144 Mc.: W3GV — W0WZ
660 Miles — September 18, 1947
235 Mc.: W1CTW — W2HWW
210 Miles — October 12, 1947
420 Mc.: W6VIX/6 — W6ZRN/6
186 Miles — July 27, 1947
1215 Mc.: W3MLN/3 — W3HFW/3
12.5 Miles — September 24, 1947
2300 Mc.: W6IFE/6 — W6ET/6
150 Miles — April 25, 1948
3300 Mc.: W6IFE/6 — W6ET/6
150 Miles — October 5, 1947
5250 Mc.: W2LGF/2 — W7FQF/2
31 Miles — December 2, 1945
10,000 Mc.: W4HPJ/3 — W6IFE/3
7.65 Miles — July 11, 1946
21,000 Mc.: W1NVL/2 — W9SAD/2
800 Feet — May 18, 1946

Pensacola, Fla. — The possibilities of 50 Mc. for a Gulf Coast emergency net look good to W4MS. The small antennas and relative freedom from QRN would make a reliable net on this band a boon for hurricane work, if only more stations could be lined up in the right locations. It can be demonstrated that a reliable working radius of 60 miles or more is possible, even with low power, in flat terrain, so the principal cities of the Gulf Coast could be linked readily and reliably by a 50-Mc. net. Pensacola 50-Mc. stations include W4s LRC, CNK, EQR, HIZ and MS. They are working on the Mobile gang in the hope of developing some 6-meter converts.

A Two-Bit Two-Minute Ground-Plane for 420 Mc.

W7KWO, who is doing a lot of 420-Mc. promoting in the region around Phoenix, Arizona, says that a ground-plane is unquestionably *not* the world's best antenna for 420 Mc., but it can be the quickest and possibly the cheapest, if made as shown in the photograph on page 51. Tom takes an Amphenol coaxial fitting, Type 83-1R, solders a $6\frac{1}{2}$ -inch piece of stiff wire (No. 12 will do, or welding rod may be used, if handy) into the center conductor. Four more pieces are soldered to the flange of the fitting for the ground plane. If these are soldered in the position shown, the holes in the flange are left to be used for mounting the completed antenna.

Activity on 420 Mc. is being maintained in and around Phoenix by W7KWO, W7MIV and W7KTJ. Long-range plans are now being made for an expedition to the San Francisco Peaks (nearly 13,000 feet elevation) next July. The boys would like to hear from interested parties

(Continued on page 126)

Merry Christmas
and a
Happy New Year
To All



W3DGP



W3GC



BARKER & WILLIAMSON, INC.

237 Fairfield Ave.

Upper Darby, Pa.

B&W

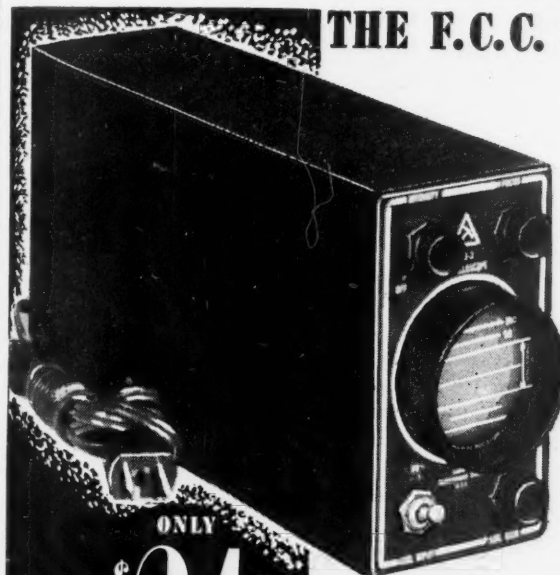
THE F.C.C. SAYS - - -

§ 12.133. Purity and stability of emissions. In the case of A-3 emission, the amateur transmitter shall not be modulated to the extent that interfering spurious radiation occurs, and in no case shall the emitted carrier wave be amplitude-modulated in excess of 100 per cent. Means shall be employed to insure that the transmitter is not modulated in excess of its modulation capability for proper technical operation.

MM-2

MODULATION MONITOR

Here is a high quality basic oscilloscope, slightly larger than a standard multimeter, that provides a continuous, visual, on-the-air check of your phone transmitter. The MM-2 permits adjustment of your transmitter for maximum efficiency and helps you keep it there. Check these top-flight features: Weighs only 4½ lbs. Full set of controls including centering and horizontal gain. Built-in AC supply. Built-in 60 cycle sweep with automatic return trace blanking. Calibrated modulation percentage scale. Beam switch for cutting off trace during standby periods. Reversible front panel for vertical or horizontal mounting. 2" screen with fine stable green trace. Table-top or rack mounting. Standard 19" punched rack panels available for permanent installation with rack mounting equipment. (See Oct. Ad for complete details.)



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\$24.95

COMPLETE WITH TUBES
REVERSIBLE PANEL-CALIBRATED
TRACE-INTENSIFIER WINDOW
INSTRUCTION BOOK

3" x 5" x 10"



LAMBDA

ELECTRONICS CORP.

BOX No. 55

DEPT. Q12

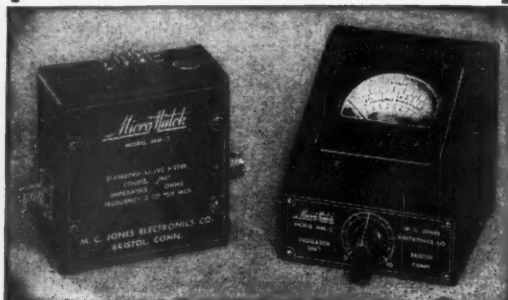
CORONA, N.Y.

IF YOUR DEALER CAN'T
SUPPLY YOU ... **WRITE**

**MORE POWER WITH SAME TRANSMITTER
AND SAME ANTENNA**

MicroMatch

MEASURES SWR AND RF POWER

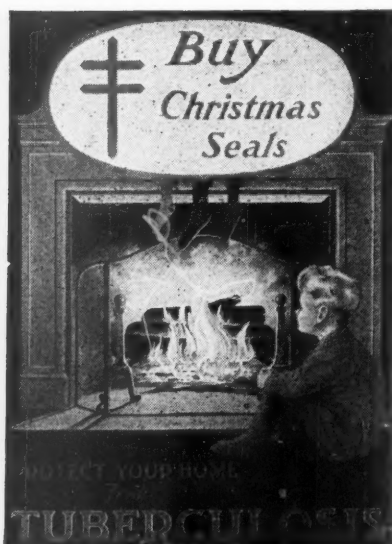


Micro-Match tells you at a glance what your actual RF power output is in watts. Also tells you SWR of antenna system. MM 1 for open wire lines, price complete \$29.50. MM 2 (shown) for coaxial lines, price complete \$37.45. Contact your distributor.

Other Micro-Match models for operation at 500 KCS to 400 MCS, and power levels of 2 to 50,000 watts.

M. C. JONES ELECTRONICS COMPANY

P. O. Box 1519, BRISTOL, CONNECTICUT



in surrounding areas for an exchange of ideas on the best methods for breaking records. Equipment for 144 Mc., and possibly 75-meter 'phone, will be taken along, and the gear for 420-Mc. will be the best obtainable.

Several correspondents have asked for clarification of the power limitation on amateur 420-Mc. operation. Our regulations state that the maximum power must be limited to 50 watts peak antenna power. This allows us a degree of leeway that few, if any, will care to try to exceed. Even if we did succeed in obtaining that much output, which is unlikely, the actual antenna power would be much lower in almost any instance, as the result of inevitably high line losses at this frequency. If in doubt, put some sort of output measuring device at the end of the transmission line to be used on the antenna system. An indication of 12½ watts (unmodulated) will be the legal maximum, if voice operation with a.m. is contemplated. If f.m. or c.w. is to be used the permissible output is 50 watts.

The Polarization Question on 420 Mc.

Numerous letters have been received asking that a standard be set for polarization on 420 Mc., and that everyone agree to use that polarization. The same request is made in connection with 144 Mc., but the difficulty of attaining an agreement, even for 420 Mc., shows us something of what might be expected on 144! Some months ago this department carried the suggestion that, since there seemed to be almost no basis for argument, one way or the other, that anyone starting up on 420 Mc. use horizontal polarization. But so far, most of the reports indicate that 420-Mc. workers are using vertical. So what say, gang — which will it be?

Correspondence

(Continued from page 57)

it, and share it we must, so we might as well make the best of it. What I think will be shared by some of us; what you think will be shared by some of us. But it is our collective opinions expressed through ARRL questionnaires and through our directors that average out our problems in terms of how the most can be served best, and while all of us can never be happy all of the time, most of us can be — most of the time. Anyhow, let's have some fun.

— John B. Morgan, W3QP

OK, FB, BUT. . . !

2101 California St., Columbus, Indiana

Editor, QST:

. . . Some of our fraternity are using R incorrectly. I always thought that it meant that the last transmission was copied 100%, but a fellow I was talking with the other day came back with "R R R OK FB BUT MISSED THE QTH ES THE NAME." Well, someone's wrong here. Maybe I ought to look up my table of abbreviations again!

— Robert Lay, W9DMK

VALUES

1928 Geddes, Ann Arbor, Mich.

Editor, QST:

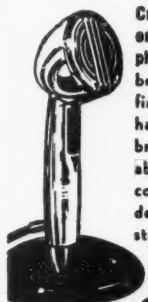
The argument for changing 'phone frequency assignments seems to be that 'phone men should be given space commensurate with their numbers. I can think of a much better argument: they should be given space commensurate with their value to amateur radio and the public welfare.

— Kenneth K. Bay, W8GSL

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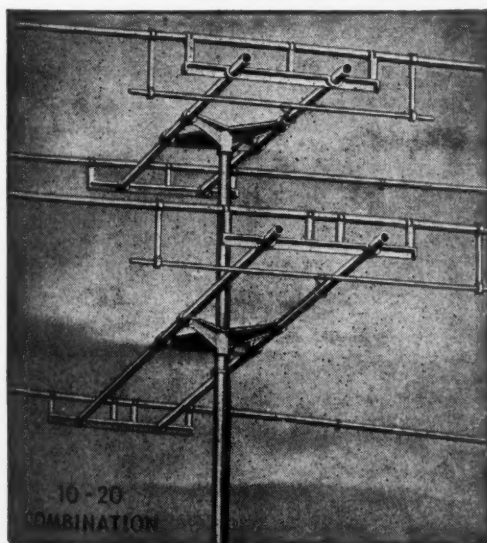


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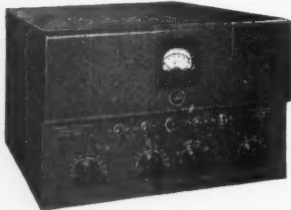
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The Navy and the Amateur

(Continued from page 38)

talk may very well be on Navy or Naval Reserve subjects. That is as far as we go in injecting Navy business into your picture.

We do this with the full concurrence of your organization. We do this to avoid any possible implication of military control or regimentation of your channels or your activities. We also do it to maintain a greater delineation between the amateur as such and the Naval Reservist. The Naval Reservist is an individual who is available for mobilization upon the declaration of a national emergency, and as such he is a man we can count upon in our national mobilization plans. Incidentally, there are still plenty of vacancies in our electronic warfare units, and we will especially welcome amateurs into those Naval Reserve units. Our Naval Reserve networks operating on Navy frequencies, using Navy call signs and procedure, serve as the training circuits for the individuals on whom we depend to fill our wartime billets if and when necessary. In the event of local disaster or emergency, we have directed our district communication officers to be prepared to coordinate amateur and Naval Reserve networks. For training for this coordination, they are authorized to activate such combined circuits as they see fit. I know that many of you are familiar with such coordinated circuits and the outstanding results which have been obtained in disasters which have struck in various parts of our country.

For many years on Navy Day, the Secretary of the Navy has directed a special message to radio amateurs through the facilities of Navy radio stations at Washington and San Francisco. In line with the commendable objective of encouraging radiotelegraph proficiency among amateurs, your ARRL conducts a receiving competition in connection with the transmission of our Secretary's message. Navy Day falls on October 27th and this year, in addition to the message from the Secretary of the Navy, the Navy Department is sponsoring a Navy Day QSO Party, which will be devoted to contacts between amateurs who are members of the Naval Reserve and those who are not.

I do not intend to say much about our Naval communications system this afternoon — because many of you know a great deal about it already. However, I should like to say just a few words about Naval communications, which serves as the voice and the ears of the Navy. Our mission is to provide an adequate means of communication at all times: first, to serve Naval command and, secondly, for Naval administrative purposes. Of course, our ships and airplanes and amphibious forces are all well-equipped for operational communications. On shore there are five principal Navy radio stations — one located in Washington, D. C., one in San Francisco, one in Panama, one in Hawaii, and one in Guam. In addition, smaller Navy radio stations are located ashore in numerous places throughout the world. Thus wherever our ships may have to operate, they will be afforded necessary communication service. Our communication facilities are netted into world-wide nets of several descriptions — radio, landwire, radioteletype, wire and radiophoto nets — in fact every conceivable method of modern communications is utilized. Of course, in peacetime we cannot maintain as extensive a communications system as we require for war. Accordingly, we must be ready to expand quickly from peacetime to wartime requirements — both in personnel and material.

Continuous research is being conducted to devise faster and more reliable means of communication to improve the systems we now have. For as the tempo of modern warfare increases, with faster ships and faster airplanes, so must the speed of communications be increased — in order that command may be exercised promptly and effectively — in directly controlling the movements and action of our military forces. Besides being fast, military communications must be kept flexible. We are apt to be called upon to furnish communications in support of various kinds of operations and command assignments requiring speedy implementation.

We are constantly trying to integrate the Naval communication system with those of the Army and the Air Force in order to achieve better preparedness, and greater economy of men, material and frequencies. This integration of the three services' communications will be accomplished without depriving any military service of the control of its

(Continued on page 130)



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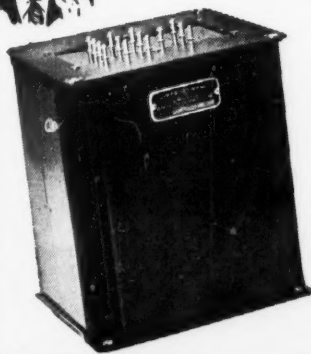
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own communications, which is essential for the effective exercise of military command.

At times we are called upon to serve other Government departments and agencies. It was but a short time ago that the Navy was requested by the State Department to install and operate a radio station in Jerusalem, with very little warning or time to accomplish. We were able to fly the equipment and personnel in and have the circuit operative by the time our services were required. Yes — there was an amateur in the small group we sent to Jerusalem in May — and like his associates on that hazardous assignment — he is doing his job well.

Like all other military officers, I earnestly hope that there will not be another war. But if there should be a war, men who know communications and electronics as do you amateurs will be invaluable in service to our country, especially in this age when our national security is daily becoming more and more dependent upon rapid communications and upon electronics.

It is with great pleasure that I speak for the Navy in saluting you — the members of the American Radio Relay League. You have a truly enviable record of accomplishment. You have been responsible for so many of the greatest strides which have been made in the development of electronics and communications. Your performance of duty, both in peacetime emergencies and in war, has been of the highest order. I know that individually and collectively you will always support and maintain the splendid record which you have firmly established as patriotic American amateurs. I bring you the Navy's highest praise: and so with my personal "73" and my sincerest thanks, I say to you, "Well done!"

The 1948 Midwest Division Convention

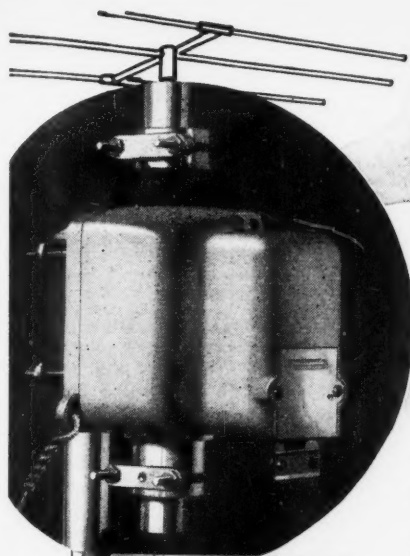
WITH an advance ticket sale of over 300 and a final registration close to 400, attendance was no problem at the 1948 ARRL Midwest Division Convention. And neither was the entertainment of the conventioners — the hard-working committee from the Wichita Amateur Radio Club had anticipated everything, and there were no dull moments.

The program opened officially on Saturday afternoon with a welcoming address by City Treasurer John Pierce, followed by an ARRL business meeting conducted by Director Len Collett, W0DEA. After eulogies of "Pop" Kerr, W0GP, and K. B. Warner, W1EH, by Director Collett, By Goodman of Hq. reported on recent actions by the League. The Director reported on Division happenings and plans, followed by section reports from SCMs W0PP, W0ICD, W5HXI, W0AWP and W0ICV. Major Ralls, K4AF, spoke on the MARS organization, and W0DW from the Grand Island Monitoring Station contributed the latest thoughts on avoiding FCC QSLs. Technical sessions then took over, with Vince Dawson, W0ZJB, telling what was being accomplished by the v.h.f. gang, a demonstration by W0EPV of the Southwestern Bell Telephone Company's portable mobile radio telephone, and a movie shown by Lt. Phillips of the USAAF on "Ground-Controlled Approach by Radar." Then everyone took a short breather before pitching in to an excellent buffet supper.

The Saturday-evening activities included an hour-long floor show by professional talent, followed by dancing and c.w., 'phone, v.h.f. and emergency round tables. A Wouff-Hong initiation was held at the traditional hour, midnight.

Everyone with 10-meter gear in his car was up early Sunday morning to participate in the Portable-Mobile Sweepstakes. This was a QSO contest limited to convention delegates, and good DX conditions on the band added QRM but detracted nothing from the fun. The morning technical sessions offered talks by Glen Chambers, W0DJL, on tuning parasitic beams and by W1DX on single-sideband techniques. The convention wound up at the banquet early in the afternoon, with Bob Paige, W0CQC, presiding as m.c. Most of the diners had trouble finishing their meals because they were too busy laughing at three local club members (who looked more like the Marx brothers than hams) demonstrating how (not) to set up a Field Day station. Father Augustine, W0IWS, eulogized the late Father Fox, W0ESL, who had been so active in organized radio in the area. Throughout the convention the ladies were not neglected, and a special nonham program kept them on the go.

(Continued on page 138)



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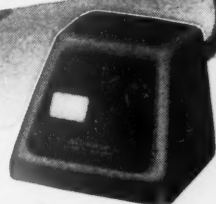
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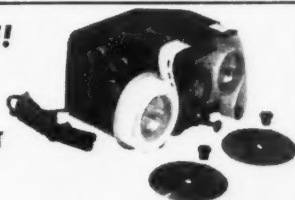
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Credit for the success of the convention goes to Bill Schmidt, W0OZN, the general chairman, Bud Livingston, W0RMV, the WARC president, and all of the other able committee members. Unlike many conventions, all events started and ended on scheduled time. Everything was planned to see that the delegates got maximum entertainment and enjoyment every minute of their stay in Wichita. The host club members introduced themselves to all guests they didn't already know. Banquet speeches were few and short. The local club members declared themselves ineligible for any awards. The accent was on hospitality, and it paid off in success. — B.G.

A.R.R.L. QSL BUREAU

FOR the convenience of American and Canadian amateurs, the League maintains a QSL-card distributing system which operates through volunteer district QSL managers in each call area. To secure such foreign cards as may be received for you, send your district manager a stationer's-size No. 10 stamped self-addressed envelope. If you have reason to expect a considerable number of cards, put on an extra stamp so that it has a total of six cents postage. Your own name and address go in the customary place on the face, and your station call should be printed prominently in the upper left-hand corner. If you have held other calls in previous years, submit an envelope for each such call to the proper manager — there are many thousands of uncalled-for cards in the files. All incoming cards are routed by Hq. to the home district of the call shown in the address. Therefore, cards for portable operation in other districts should be obtained from the home-district manager.

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- W3, K3 — Jesse Bieberman, W3KT, Box 34, Philadelphia, Pa.
- W4, K4 — Johnny Dortch, W4DDF, 1611 East Cahal Ave., Nashville, Tenn.
- W5, K5 — L. W. May, jr., W5AJG, 9428 Hobart St., Dallas 18, Texas.
- W6, K6 — Horace R. Greer, W6TI, 414 Fairmount Ave., Oakland, Calif.
- W7, K7 — Frank E. Pratt, W7DXZ, 5023 S. Ferry St., Tacoma, Wash.
- W8, K8 — Fred W. Allen, W8GER, 1959 Riverside Drive, Dayton 5, Ohio.
- W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wisc.
- W0, K0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn.
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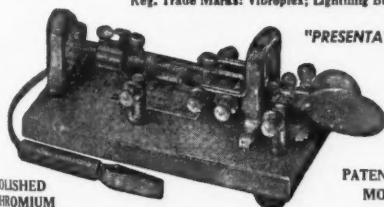
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You'll be surprised how easy it is to send with this
New, Super-Deluxe Vibroplex key. You'll be able to
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High QUALITY—High POWER Custom-Built AM-FM Chassis

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both antennas, and all necessary hardware. It's your best
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ESTABLISHED 1928

Merry Christmas to All!

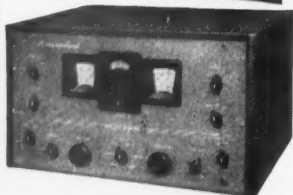


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The following partial list of unbeatable values will make many a Ham happy this Xmas and for months and years to come. Each instrument thoroughly checked and guaranteed to meet manufacturer's original specifications. Equipment available in quantities shown at time this publication goes to press.

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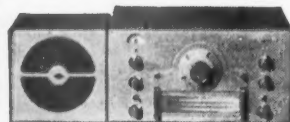


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Q-12

☐ Rush my order for used equipment as follows: 1st choice:

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Quantity	Make and Model	Regular Price	Our Low Bargain Price
3	Bud VFO-21 with coils	\$ 52.50	\$ 20.50
3	Hallcrafters IIT-9 Xmitter with tubes and 3 sets coils	350.00	225.00
2	Hallcrafters SX-16 & spkr	126.00	60.00
7	Hallcrafters S-20R	60.00	40.00
3	Hallcrafters SX-24 no spkr	74.50	50.00
1	Hallcrafters SX-28, less spkr	223.00	110.00
3	Hallcrafters S-36A less spkr	307.50	140.00
1	Hallcrafters S-37 less spkr	591.75	105.00
2	Hallcrafters S-39	110.00	60.00
8	Hallcrafters S-40	89.50	57.50
3	Hallcrafters S-41	36.75	26.00
2	Hallcrafters SX-42 & R-42 spkr	334.50	105.00
5	Hammarlund HQ-129 X & spkr	189.15	125.00
1	Hammarlund SP-400X & spkr	450.00	240.00
3	Howard 437	61.95	45.00
3	Howard 435	36.75	25.00
8	Millen R9'er with tube and coil	24.75	19.50
4	Millen 90700 Vari-Arm	42.50	29.95
4	Millen 90800 Exciters with tubes and coils	42.50	27.50
3	Meissner '41 Sig Shifter	49.50	25.00
4	Meissner Sig Shifter (Postwar)	89.50	60.00
2	National HRO-7 complete with power supply, spkr & coils	324.86	225.00
9	National 1-10 power supply, spkr & coils	101.93	42.50
2	National NC-200 with spkr	159.50	99.50
1	Pierson KP-81 & spkr	386.00	200.00
4	RME-45 & spkr	198.70	98.70
3	RME-69 & spkr	152.88	59.50
2	RME VII-152	86.60	50.00
3	RME VII-152A	86.60	60.00
3	Sonar VFX-680 FM Exciter	87.45	49.50
2	Sonar XE-10 FM Adapter	39.45	19.50
2	Transmeter 905 Xmitter tester	49.50	19.50

A host of other makes and models available. Write for complete list.

"SURPRISE" Trade-in Allowances on your used, factory-built Communication Equipment. In the coupon provided tell us what you have to trade. Indicate your preference in New Equipment. We'll come right back with a money-saving offer that's sure to please. Mail the coupon right now!

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HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.

(6) A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League takes the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested signature and address be printed plainly.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

QUARTZ—Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 719 World Bldg., New York City.

QSLs, 100, \$1.50 up. Stamp for samples. Griffith, W3FSW, 1042 Pine Heights Ave., Baltimore 29, Md.

BEAMS pre-focused and matched to typical lines. Large diameter duro-aluminum tubing for elements and boom. Peter C. Houskeeper, 956 Paulding St., Peekskill, N. Y.

QSLs? SWLS? America's Finest! No cheap trash! Samples, 10¢. QST Printer Sellers, W8DED, Holland, Michigan. "Made-to-order QSL card service".

AMATEUR radio licenses. Complete theory preparation for passing amateur radio examinations. Home study and resident courses. American Radio Institute, 101 West 63rd Street, New York City.

QSLs, SWLS. Large variety of samples for stamp. Also your own designs. W2DEE, Maple Shade, New Jersey.

CRYSTALS: Precision low drift units. Type 100A in 80, 40, and 20 meter bands. Two units plus in one octal socket. Plus or minus 5 Kc. One dollar each. Exact frequency. \$1.95 ea. Rex Bassett, Inc., Ft. Lauderdale, Fla.

10-METER Beams, \$19.50. Send card for free information. Riverside Tool Co., Box 87, Riverside, Illinois.

QSLs, Samples, Albertson, W4HUD, Box 322, High Point, N. C.

SURPLUS: Deluxe crystal finishing kits containing holders, quartz blanks, abrasive, etching fluid, complete instructions. \$2.00 each postpaid. Formerly sold \$8.75. Vesto Company, Parkville, Missouri.

QSLs Quality cards priced right. Samples. Ferris, W9UTL, 1768 Fruitdale, Indianapolis, Ind.

SUBSCRIPTIONS, Radio publications a specialty. Earl Mead, Huntley, Mont. W7LCM.

QSLs: Kromkote cards at a fair price. Dauphinee, W1KMP, Box 219, Cambridge 39, Mass.

WANTED: Teletype 1/40TH HP synchronous motor. W6ITH, Tibbetts, Moraga, Calif.

QSLs, SWLS. For distinctive cards, write to McEachron, 1408 Brentwood, Austin, Texas.

DON'S QSLs, "The finest". Samples. Don Hill Press, 2106 South Sixteenth Ave., Maywood, Illinois.

GIVE Hallicrafters receivers. Lay-away plan. Easy. Atlas Radio Jobbers, Tel. 6-3800, Nashville, Tennessee.

QSLs? SWLS? Distinctive designs, glossy stock, one-day service. Samples. Narvestad, Granite Falls, Minn.

QSLs, SWLS. Finest stock. Fairest prices. Fastest service. Dossett, W9BHV QSL Factory, 857 Burlington, Frankfort, Ind.

SWA's: Complete station, HQ-129X, 150-watt xmitter, T3 mike, many extras, like new value, \$300.00, for good camera. Also Sonar XE10, mike, 42" cabinet for \$38.00. Write for details. All inquiries answered. Al Hoffmann, W2JTF, 275 Woodbine St., Brooklyn 21, N. Y.

INSTRUCTION books for BC-224, 312, 342, 348, 150µ amp, 2" meter, \$3.00, 12-28V DC power supplies, also selenium rectifiers. Weston 564 voltohmmeter, \$18.00. Ham type handset, \$2.00, 130 foot beaded copper coil, 3/4 and 2 1/2 hp. gasoline engines for field day power plants. W2SL, 490 Fairfield, Ridgewood, N. J.

NEW, quality Mac Key, black crackle heavy oval base, won't tilt, no fastening required. Circuit closing lever, chrome plated parts, adjustable bearings 3/16" silver contacts, \$1.00 postpaid. Slug tuned low-loss ceramic coil forms, single hole mounting as used in R-9er. Would-to use on 6-10-11-15. Can be rewound for other bands. Instructions. Four for \$1.00 postpaid. Ed Doherr, 96 Highland Street, Boston 36, Mass.

TRADE or sell: Collins 75-A-1 receiver for \$325.00 prepaid or best offer in 16 mm. movie camera and sound projector. W4A1S, Box 1499, Greenville, S. C. Receiver three months old.

TUBULAR condensers, .01Mfd, plus or minus 10%. Normal working voltage 100 DC. \$3.00 per M. \$75.00 per 10M. Young & Underwood, Box 8, Sta. A, Atlanta, Ga.

NEW York City Ham's Sell: TR4B and tubes, \$15.00; Elec. Lab. 6 and 110V input power supply, \$15.00; Millen Variarm, \$30.00; Bliley Variac with variable xtal, \$20.00; pair used Gammatron 1K254 tubes, \$10.00; pair unused Eimac 4-125A tubes and sockets, \$35.00; QSTs, 1933 through 1947, \$30.00; 20-meter beam rotator, gear reducer 1750 to 1 Rpm; reversible motor, control unit indicator, \$35.00; VFX680 NBFM with xtal, \$65.00; Edward F. O'Brien, W2GFV, 86-10 34th Ave., Jackson Heights, L. I., N. Y.

SELL Class B 809 modulator multi-match input and output transformers, 600 volt power supply on same chassis, \$25.00, 1" National oscilloscope with two 913 tubes, \$15.00. W0WQR, 8642 Eulalie Ave., Brentwood, Missouri.

AUTOMATIC new revolutionary time indicator, giving comparative times every part of the globe, with modern colored map chart. Specially recommended by Popular Mechanics (Feb. 1946, p. 75) to short-wave enthusiasts. Send only one dollar for sample. Box 126, Macleod, Alberta, Canada.

FOR Sale: Model ET-4336-B RCA transmitter including table mounting speech amplifier and line transformer 115 to 230 volts power output of transmitter is 600 watts C.W. 400 watts phone. First \$250.00 takes this rig, complete. Shipped F.o.b. Mobile, Alabama. W4LNA, Warren, 1865 Cardinal Drive East, Mobile, Alabama.

FOR sale: Meissner signal shifter, Jefferson-Travis xmitter-rcvr (50-watt); 701 Silver transmitter with coils, BC645 HF unit (new) RCA 10-meter mobile transmitter, BC654s, PE103A dynamotor, vibrapacks, cables, 920 Precision tester, 188x signal generator, RCA 3" oscilloscope, CTC & Kenyon chokes and transformers, tubes and miscellaneous parts. Send for a complete list of bargains. Want a good all-wave receiver for 6-volt operation ham bands or converter to put in car. W3BBV, P. O. Box 722, York, Penna.

SELL: Collins TCS, used. Includes receiver, transmitter, shock-mounted; antenna tuner, remote unit with speaker, cables, A.C. power supply, V.F.O., 1500-12000 Kc. phone/cw, portable, mobile, emergency, yacht. \$150.00. Also 6 amps. 28 volts D.C. from 110 A.C.; set HRO new metal tubes; New BC-375E, Harry S. Gantz, W8QMN, 3107 Midgard Road, Columbus 2, Ohio.

BC-348-P Receiver, brand new, with mounting 110 V. A.C. \$95.00. 104-17 Farmers Boulevard, Hollis, L. I., N. Y.

IN Stock: New and reconditioned Collins, National, Hallicrafters, Hammarlund, RME, Millen, Sonar, Meck, other receivers, transmitters, etc. Reconditioned S-38, \$35.00; S-40, \$59.00; S-36, \$129.00; NC46, \$59.00; RME-45, \$99.00; SP400X, \$249.00; HT9, \$250.00; BC610, \$345.00; SX25, SX28A, S-20R, SX43, SX-42, HT18, DB20, DB22A, HF-10-20, VHF152A, HQ-129X, NC-57, NC-173, NC-183, HRO, NC-200, NC-240D, BC-348, and other receivers, transmitters, VFO's, etc. Easy terms. Shipped on trial. Write for list. Henry Radio Stores, Butler, Missour.

LAPEL pins: your ham call letters engraved in white on black plastic, 1 1/4" by 3/4" with white border, 35¢ each, postpaid. G. Lange, W2IYQ, 34 Union Ave., Belleville, 9, N. J.

PANELS, dials made to order. Gilpin, Box 638R4, Mt. Clemens, Michigan.

SIGNAL Shifter, new Meissner EX. 80 to 10. Factory wired. In perfect shape. Used less than six hours. Sell for \$69.50. A. Josh Tumlin, Cave Spring, Ga.

WILL trade a P-38 Walther 9 mm. semi-automatic pistol for good communications receiver. W4NZ1, 3390 Buchanan St., Memphis, Tenn.

WANTED: Portable transmitter-receiver for 144 Mc. No surplus. W2IAW.

SELL complete 12-watt 10-meter mobile rig, two 10-meter xtals and microphone, \$25.00. W2TPZ, Wickens, Box 16, Eastport, L. I., N. Y.

SELL QST's, 1925 through 1936, except for few issues. Best offer. W2NNL, Sharp, Box 651, Allendale, N. J.

WANTED for cash: Set of 3.5 to 4 Mc. bandspread coils for AGS or AGSX receiver. Albert Hayes, 38 LaSalle Rd., West Hartford, Conn.

FOR Sale: BC-348-Q receiver, converted to A.C., \$60 or best offer. Ted Clogston, W2WZU, 1709 Ford St., Ogdensburg, N. Y.

COLORTONE QSLs Snappy! Bright! Different! Big variety! Beautiful colors! Outstanding craftsmanship. Samples? Colortone Press, Tupelo, Miss.

BC-221 frequency meter, tubes, crystal and calibration book in original case with modulation, \$40.00. BC-221 frequency meter driver unit in Motorola cabinet, 22 x 12 x 15 built W7NU specifications, March 1947 QST, 8 tube voltage regulated at cost of parts, \$50.00. Photo if interested. RME-70, like new, \$125.00. Speed Graphic 4 x 5 and accessories, \$250.00. Twenty, 1 ufd 6000 volt Westinghouse condensers at \$4.00 each. Will swap, need RC-153 tripod tower set. W5AY, 326 Fairfax, Little Rock, Arkansas.

SUBRACO MT15X dashboard mobile, brand new, cost \$87.50. Latest model. Used once, perfect, \$65.00; Meissner signal shifter, latest model, factory built, with NBFM, cost \$120.00; Sell \$60.00. W2NCY, Dumont, N. J.

SELL: Hammarlund BC77-B (Super-Pro) complete with AC power supply and speaker. Factory inspected, aligned and modified last July to minimize drift. 80-40-20 meter ham bands plus 100-400 Kc marine. \$150.00. Abernathy, W1QKV, 233 Chapman, Canton, Mass.

SELL: Used tubes 833's, \$10.00; 845's, \$3.00; 872's, \$1.00; 843's, 50¢; 805's, \$3.00. W5AQC, c/o KFRO, Longview, Texas.

SALE: National FB7XA with National preselector and 15 coils, \$30.00. F.o.b. Fond du Lac. W9IHG, Schwark, 193 West 12th St., Fond du Lac, Wisconsin.

WANTED: QSTs, Dec. 1913 to March 1917; ARRL Handbooks first to eighth Editions. Sell 200 miscellaneous copies QST, from 1920 to 1947. W0MGN, 1022 N. Rockhill Road, Rock Hill, 19, Mo.

FOR Sale: Easy K.w. in console, separate power supplies, BC-221 VFO, March 1947 QST, D104 mike. Finest components throughout. Complete 3 element rotary beam and many extras. Excellent reports. Details by mail or see any time. Midwest hams, here's your buy! All reasonable offers considered. Don Savin, W0ZFK, McCook, Nebraska.

SELL new SX-42 Hallicrafters receiver and R-42 speaker in perfect condition. Quitting the ham game. Submit your best offer. Write 222 24th Street Drive, Cedar Rapids, Iowa.

SALE or trade: McMurdo Silver Model 906, slightly used, AN/APT-5 transmitter, new; Want: Meissner signal shifter, VFO, or exciter, receiver, or what have you? William M. Mazer, RFD 4, Box 325, New Brunswick, N. J.

FOR SALE: HRO-M, ABCD coils, power supply, \$150.00; National 1-10, less power supply, \$30.00; Burton signal generator, \$20.00. W.H.O.D. Webb, 20 Bullard Ave., Holyoke, Mass.

HALLICRAFTERS S-47, loss speaker, used very little, \$180 or best offer. W3FXR, 123 Belmont Ave., Milmont Park, Penna.

FOR SALE: BC-348-Q receiver with power supply. Coble, 434 Pammel Court, Ames, Iowa.

FOR SALE: Stancor 110-CM factory-built, in gray cabinet, all coils 80-10. Antatic D-104 mike. Receiver BC-348M converted to Ao. VFO as of QST 1946. All in A-1 condition, for \$225.00. No low bids. Mason H. Booth, W5IKN, Wagoner, Okla. Reason for selling: moving.

QSL'S: Quality printing. M. Vincek, W2LNT, 111 Center St., Clifton, N. J.

SWAP: Signal generator 118A, Signal Corps, for RME-DB20. Sale: Receiver RCA one eleven 15-tube, with S-meter and speaker. Best offer takes. G. McClellan, 706 Summerlee St., Pittsburgh 6, Penna.

SELLING out: BC-348-Q receiver for 110 V ac, \$60.00. New Millen exciter, \$32.50. 125 w. fone/cw transmitter, wiring almost complete, \$100.00. Power supply and audio transformers and chokes for 15 w. 6B4G audio amplifier, \$17.50. Hickok Model 125 VT volt-ohm-milliammeter, \$75.00. William Youngblood, W5MMP, 1200 West 2 1/2 Street, Austin, Texas.

FOR Sale: 200-watt custom-built all-band xmitter, fone or cv. Brand new, must sacrifice, photos 10¢. C. L. Jennings, New London, Iowa. W6GZ.

I wish to obtain genuine crystals as required to operate the 144-148 Mc portion of SCR522A or SCR542A transmitters and same receiver frequencies of BC624A or BC624T. Offerings solicited. Rae C. Palmer, Moodus, Conn.

GIVE that OM a really useful gift! A set of beautiful clear-type maps, printed in five vivid colors on the finest paper. Include time zones, steamship routes and coordinates. Size 50" x 38". US and World editions, \$1.25 a set postpaid or on approval. Gordon Powell, W2PLH, 68 Lyall Rd., Clifton, N. J.

WANT to buy used PE-103, used BC-459 or used BC-696. Write W9CJO, Route 4, Madison 5, Wis.

TRADE: New and used 274N xmitters, rcvrs, used Dekker 1/4" drill; used 806's, 100TH's, 4-125A's; Satchell-Carlson rcvrs. Want: converter, power equipment, bug, or what have you? R. Harmon, W0FTK, Hugoton, Kansas.

COLLINS ART13, dynamotor, instruction book, \$150. Frank Curtis, Jr., W0VQC, Virgil, So. Dakota.

QSL'S-SWL's! Neat, reasonable. Samples. Cushing, W1HJI, Box 32, Manchester, N. H.

BEAM rotator, driven by 5G selayn through 36-1 gearing, 5F selayn at 1 speed for position. Navy surplus item. Unused, \$30. W2DSB, RD-1, Baldwinville, N. Y.

FOR SALE: HT-9 transmitter complete with coils for 10M-20 M, 40 M — 80 M coils. Price \$225.00. Samuel Strauss, W2RCN, 94-06 34th Road, Jackson Heights, L.I., N.Y.

WANTED: Bendix dynamotor 3206 and Cornell B.N. capacitor bridge, also I have for sale IE36 test equipment for \$22, \$20.00. H. I. Griffiths, 39-82 65th Place, Woodside, L.I., N.Y.

SELL ART-13 excellent condition, converted, 110v. power supply, new surplus parts, rack mounted; 1200 v 600 Ma; 500 v 350 Ma; 24v. 10 amp. 10, 6.3, 12.6 vac. Plugs, diagram, \$225.00. W. Robinson, 510 S. Howard, Spokane, Wash.

SELL: HRO-M with 4 coils and power, \$145.00. Extra G.C. coils, \$5.00. Transvision "H" assembled, \$139.00. Echophone, \$19.95. DB20, \$35.00. Cash or swap. Wanted BC-348, 312, untampered. Livingstone, Ellis Ave., Fair Lawn, N. J.

QSL'S-SWL'S. Meade, W6KXL, 1507 Central Ave., Kansas City, Kans.

WILL buy, sell, trade ham gear. Write for Bargain Bulletin. Albert Arnold, Box 706, Amarillo, Texas.

FOR Sale: HRO receiver, complete set of coils, including broadcast. \$135.00. W. Armstrong, W3GEV, Mortonville, (Chester Co.) Penna.

SELL: HQ-129-X with speaker, like new. C. Horn, #325 East 163rd St., New York City 56, N. Y.

SELL: BC-610-E factory converted, 10 to 80 complete with tubes, coils, tuning unit, junction control box, JB-70 and speech amplifier. Pick up at W9CGJ, \$590.00. BC-348-Q AC converted, \$90.00. C. W. Luger, 7990 Oakland Dr., Indianapolis, Ind.

PROCEEDINGS of IRE, set 1913 through 1947, missing four issues in run. \$420.00 F.o.b. Mineola, L. I., N. Y. W6GOV, Albertson.

SELL: Hammarlund HQ-120-X, LS3 speaker, \$105.00. Sonar XE10, \$28.00. Robert Stein, W2LWK, 433 West 34th St., New York City, N. Y.

WANTED: Hallicrafters HT-7 frequency standard. W0DJM, Dale C. Conger, Box 545, Wagner, So. Dakota.

MILLEN R-9'er, 10 and 20 meter coils, like new, \$20.00; Peak pre-selector 2-stage, \$16.00; Thorlerson 1500 volt transformer, \$16.00. A. Lukach, 35 East 84th St., New York City.

SALE: QST's from 1924, most issues. W0DBD, 3329 Abner Pl., St. Louis, Mo.

BARGAINS: New and used transmitters, receivers, parts. New 150-watt phone, \$199.00; 60-watt phone, \$99.00; Globe Trotter, \$57.50; Abbott TR-4, \$29.50; HT-9, \$295.00; MB-611, \$59.00; VC-173, SX-28, \$149.00 ea.; HQ-129-X, \$139.00; RME-45, SX-25, \$99.50 ea.; RME-9D, \$39.50; SX-24, \$73.00; S-40, \$65.00; S-20R, \$49.00; NC-44, S-38, \$35.00 ea.; Silver 701, \$29.00; many others. Large stocks, trade-ins, free trial. Terms financed by Leo, W0GFQ. Write for bargains and best deal to World Radio Laboratories, 740-44 West B way, Council Bluffs, Iowa.

NATIONAL 81X communications receiver, \$44.00; Pair MAB 80-meter walkie-talkies, \$50.00; twelve battery handi-charger, \$23.00. Want HT9. Will swap HT6 and cash. W9EPG, David Krueger, 10330 S. Hamilton Ave., Chicago 43, Illinois.

BC-610-E like new, complete, \$685.00. Van Sickle Radio, Indianapolis, Ind.

CHANGING frequency? Fine commercial units for SCR-522's, police, taxi, aircraft, marine, geophysical, and other services except amateur. Commercial regrounding. Many crystals can be economically reground to new frequencies. Inquired Over twelve years of satisfaction and fast service! Try us first. Eidson Electronic Co., 1802 No. 3rd, Temple, Texas.

SIGNAL Shifter, \$35.00. Meissner 1942 model, with coils for 80, 40, 20, 11, 10, and 6-meter bands. Louis Lechenger, W5IHL, 5118 Linden St., Bellaire, (Houston) Texas.

BE the first in your city to build and repair rigs by the new printed circuit methods. Kits of conducting and resistance paints, repair and building instructions. Standard \$3.00; Super (with silver paint), \$5.00. Free literature. Microcircuits Co., D-apt. 3C, New Buffalo, Mich.

TRADE VHF-152A for kodak 35 with coupled rangefinder or equivalent. Bernard Levine, 184 Waverly Place, N. Y. 14, N. Y.

BC-348 with RA20 pack, \$55.00. PE103 with plug, \$7.00. BC696, \$8.00. W0VXQ, Box 403, Naperville, Ill.

NATIONAL HFS receiver, one month old, in excellent condition, \$110.00. W2PVG, E. Hood, 99 Evergreen, Elmira, N. Y. 236 issues of QST: 15 copies 1920-22, complete run from March 1923 through September 1941, except April 1926 and August 1941. Includes Vol. 7, bound, \$35.00. Also Grebe CR-9, \$10.00, and Magnavox R-3, \$5.00. All F.o.b., East Rochester, N. Y. W2BEN, Lucia, 706 Madison St.

QSL'S, SWL'S. Merry Christmas to OM's, XYL's, YL's, everywhere! C. Fritz, 1213 Briargate, Joliet, Illinois.

HEAVY duty deluxe black cabinet racks for sale, 30" panel space, overall width 23", depth 20 1/2", shipping weight 123 pounds. Equipped with hinged rear door and angle shelves for chassis. Worth \$30.00. Cost you \$17.50. H. Gordon, W1IBY, 12 Sunnyside Ave., Wellesley, Mass.

WANTED: Biley variable crystal frequency about 3510 Kcs. William Roy, La Grangeville, N. Y.

WOUFF HONG ash trays, souvenirs of National ARRL Convention, Milwaukee, Sept. 4, 5, 6, 1948. Aluminum detachable Wouff Hong replica, raised lettering on ash tray, \$2.50 each, shipped prepaid. Milwaukee Radio Amateur's Club, 1529 North 37th St., Milwaukee 8, Wis.

EXPERIMENTERS, Amateurs! "Radiobuilder", 3 issues 25¢. Laboratories, Eye-O, San Carlos, California.

QSL-SWL'S. Samples. Wagner, W4JDC, College Press, Box 42, Winter Park, Fla.

FOR SALE: Four new Eimac 450TH tubes, \$19.00 each, or will trade two for Amertran 6200 V.C.T. 700 Ma. transformer. W4WR, 1601, 13th Court North, Birmingham 4, Ala.

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TRADE DeForest's training course for ham equipment. Lawrence Owens, W4MUW, RFD 3, Gadsden, Ala.

SELL: Scott Marine receiver SLR-M, practically new, \$155.00. New Meissner FM tuner, \$30.00. Mitchell M. Rosenbaum, 2314 Enright Road, Far Rockaway, L.I., N.Y.

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HALLICRAFTERS SX-25, bought new May 1946, matching speaker cabinet, in tip-top condition, realigned, \$85.00. J. Brown, W2SQG, 60 Prospect Place, Rutherford, N.J.

DB22A, \$59.95; VHF-152A, \$69.95; RME-45, \$139.95 (all slightly used). W8ZTV, P.O. Box 218, Holland, Michigan.

BC610D speech equipment, coils and tuning units ten through eighty meters; \$575.00. Also BC348R, converted AC with extra audio, noise limiter, 100 Kc oscillator, speaker, \$65.00. Both units like new. Above prices or best offer. W0HUT, 7739 Brookline, Richmond Heights, 17, Missouri.

FOR Sale: BC-610D, complete, like new. Best over \$600.00. W9JSP, Lawrence Jackson, 826 North Vernon St., Princeton, Ill.

WANTED: Small fone xmitter 10 to 100 watts, unfinished or finished, kits, etc. Give full particulars. Jack Watt, W8HYQ, Ontonagon, Mich.

500 W. Millen xmitter and power, 522 xmitter 5 xtals, and FBC power, Cardwell rcvr. 143-451 M.C. complete. Must sell \$175.00 or best offer. R. Beech, 2813 N. 2nd, Philadelphia 33, Penna, GA 3-5555.

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FOR Sale: Harvey 1 Kw xmitter, rebuilt with 810's final. \$475.00. Sonar VFX 680, \$60.00. Two, six and ten meter converter, \$35.00. Sky Traveller, \$50.00. SP44 Panadaptor rack mounted, \$30.00. Supreme 2-inch scope, \$15.00. Wanted: Collins VFO and Gen-set 10-meter converter. W2UXI, Alton Millen, 9012 52nd Ave. Elmhurst, L.I., N.Y.

FOR Sale: VX101 deluxe in perfect condition. W1VG, 99 Bentwood Road, West Hartford 7, Conn.

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WANTED: Aircraft radios: BC-348, AN/ART-13, RTA-1B, AN/APN-9, R5A/ARN-7, AN-ARC-1, SCR-715, BC-788-C, I-152, MN-26-C; test sets with TS- or I-prefix. Dynamos, control boxes, others. State quantity, condition, and best price in first letter. Hi-Mu Electronics, Box 105, New Haven, Conn. COMPLETE: Sonar NBFM XE10 with eleven \$3.00 xtals for ten, Millen Variarm VFO, both custom-coupled to Teco T60 sixty-watt transmitter for ten and twenty. All in perfect condition. Offering AM-NBFM-VFO-xtal fone and cw for \$175.00. Prefer to sell locally. George M. Clark, Jr., W2JBL, 222 Hicks St., Apt. 4C, Brooklyn 2, N.Y.

25 cycle, 500 kva plate transformer 110-120V, 5000 vct filament transformer, 10v, 300kva \$35.00 for both, F.o.b. Annapolis. For the information of former members, the USNA Radio Club will be watching for them on 7280 Kc. E. W. Carr, USNA Radio Club, Annapolis, Md.

FOR Sale: Completely assembled television assembly kit, with 10BP4, 12" PM spkr, DuMont inputuner, tunes 54-217 Mc. Never used except to check. \$200.00. John R. Crane, Excelsior, Minn.

SELL or swap: 3.0 KVA cased G-E pole transformer, 4800 volts C.T. for .45 automatic pistol. W4KTZ, Clarksville, Tenn.

HT-9 with coils like new. \$300.00. Herb Cooper, WIOCL, 104 Wayland St., Roxbury, Mass.

FOR Sale: New and near-new power transformers, chokes and condensers, Thordarson multi-match. Mod. transformer. Also QSTs, "Radio's". Other miscellaneous trans. equipment. Send for list. A. Martinka, 1253 Grace St., Chicago, Ill.

FOR Sale: HQ-129X, perfect, \$130.00; RME-45, good, \$100.00; Silver 701 xmitter, supply, spare parts, perfect, \$35.00; Bud VFO-21, spare coils, \$35.00. Misc. items. Selling out. F.o.b. Miami, Fla. First come, first served. Max Platan, W4MMT, 213 5th St., Miami Beach, Fla.

ALUMINUM tubing in 12 foot lengths, most sizes, send for list. Willard Radcliff, Fostoria, Ohio.

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FOR Sale: complete 375 watt fone xmitter. Includes 7CS, 7CS-815 exciter, speech amplifier and associated power supplies and rack contained final consisting of PP 812H power amplifier, PP 811 modulator and two 300 ML Hi-V power supplies. Fully metered. Make an offer. Estate of W2OXD, 10 Sound View Circle, White Plains, N.Y.

HEAVY gauge aluminum chassis and shields built to your specifications. Quotations by return mail. Highland Metal Products Box 578, Highland, Indiana.

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FOR Sale: RME DB20 preselector. Ralph Strite, 31 North Grant, Waynesboro, Penna.

SALE: Receiver, transmitter, many tubes and parts. Send for list. P. Trautwein, W2PLS, 40-25 206 St., Bayside, L.I., N.Y.

NON-KEY, electronic fully automatic key, practically new, \$20.00. N. Pomeranz, W2WK, 5 Koelbel Court, Baldwin, N.Y.

SELL or trade: One BC348, Hammarlund 4-20 transmitter, 4-11 modulator, Francini Accordion (\$250.00) new. Will sell for \$200.00. Write to Howard M. Klinebell, Box 151, Bottineau, North Dakota.

BC-654 80-meter transmitter-receiver, new, tested, \$25.00. Panosciloscope AN/APA-10, new, converted to 110 AC. Cost \$100.00. Sells for \$75.00. No use. Instructograph, 10 tapes, reasonable. Like trade on Arc 5 VHF xmitter, W9CNW, 709 W. Oregon, Urbana, Ill.

NEW Hallicrafters model S-36A (not surplus) receiver, first \$150 takes it. Used Howard Model 440, 9 tubes, xtal filter, and spkr in perfect condx. First \$70 takes it. W20CP, Geo. Mausteller, RFD 2, Elstina, N.Y.

HALF kilowatt Westinghouse CW rig used for airline communications, relay shifted four bands. BC456 added for VFO. Provision for NBFM. Best offer over \$2.50. W2WOQ, 22405 137th Ave., Laurelton, L.I., N.Y.

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FOR Sale: One new HQ-129X complete with speaker and manual, \$134.50; one new NC-240-D complete with speaker and manual, \$199.50; one NC-46 complete with speaker and manual, slightly used, \$69.50. Ward Lantis, W4LEB, 2207 Millie Street, Westwood Hills Add., Kingsport, Tenn.

BEST offer takes 160-watt fone rig, complete all bands. D-104 mike, etc. J. C. Paulsen, W0ZAL, c/o Milwaukee Road, Avon, So. Dakota.

SELLING out, complete ham station, xmtrrs, receiver, monitors, test equipment, books and spare parts, etc., \$350 cash. Send postcard for detailed list. John Wallace, W2LCU, 18 Third Ave., East Islip, L. I., N. Y.

WANT 7 Mc. handspread HRO coils. Paul Rockwell, 910 Overbrook, Baltimore 12, Md.

SACRIFICE! Cash wanted: receiver NC-240D and speaker used 2 months, \$180.00; frequency meter BC-221, \$33; transmitter, fone/c.w., 150 w. 80-10 complete audio and power supply, all enclosed in 28" Par-Metal grey crackle finish cabinet \$120.00; wire recorder, Webster, portable, new, \$118; new spare plate transformer, Thordarson 1500 v. @ 500 Ma., \$29.00. G. L. Schultz, W2EJB, Essex Fells, N. J. Ca. 6-4394.

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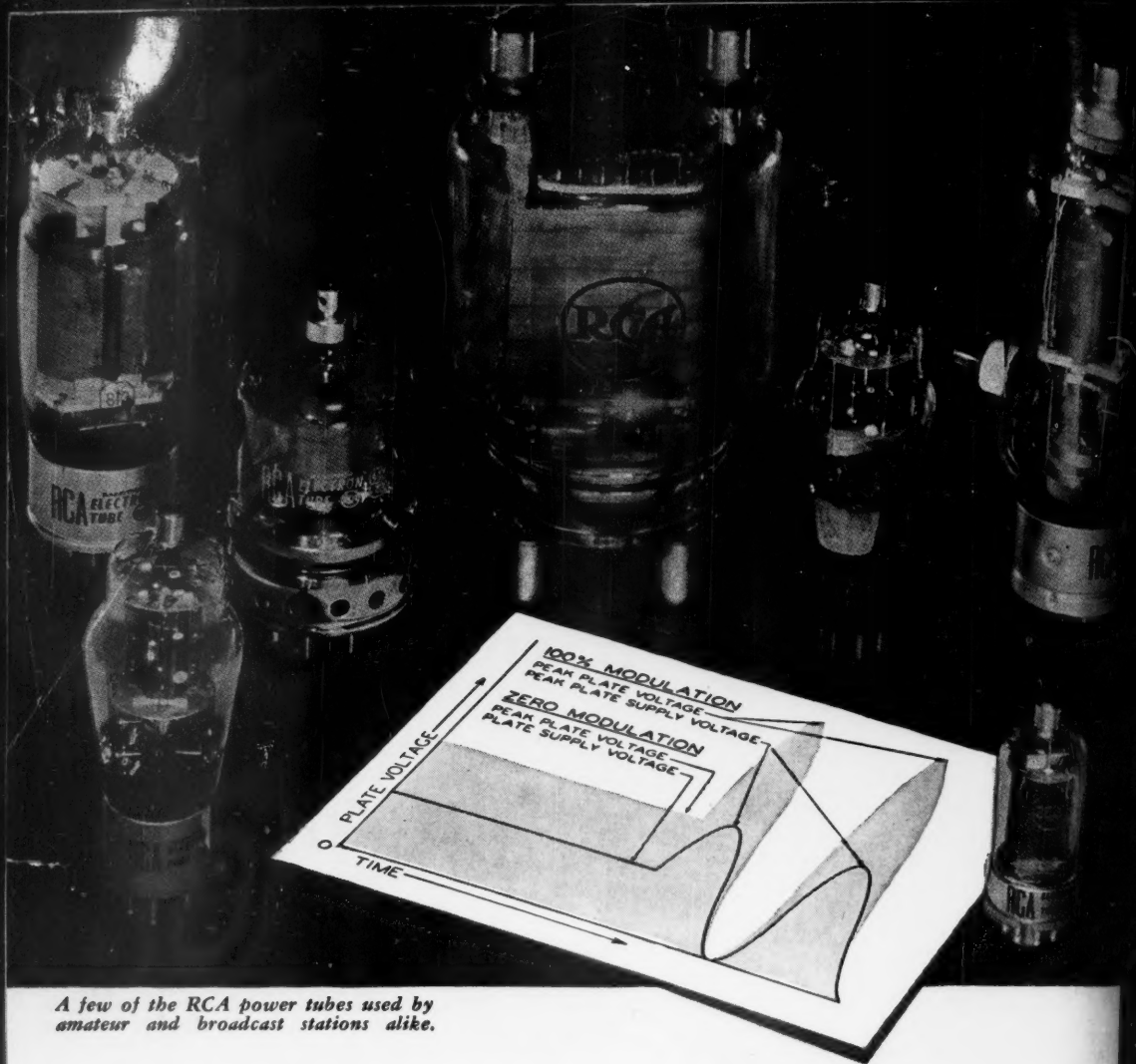
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